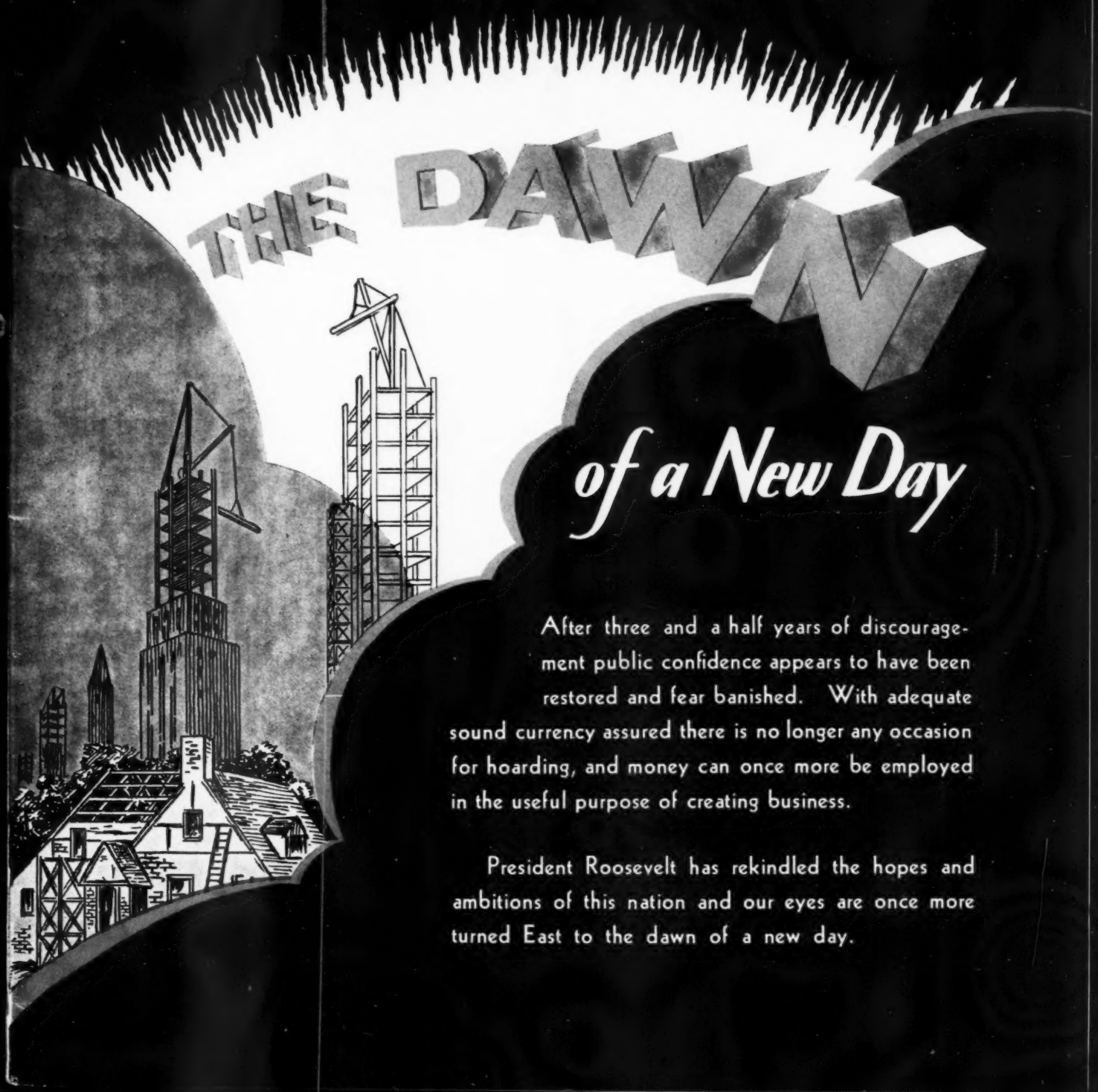
April
1933

Electrical Contracting

With Which Is Incorporated
The Electragist



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NUMBER 6

electrical contracting

WITH WHICH IS INCORPORATED THE ELECTRAGIST

S. B. WILLIAMS, EDITOR AND GENERAL MANAGER

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Co-operative Marketing

IT is with considerable pleasure that we call attention to an address on cooperative marketing delivered on March 15 before the Electric Association of New York by H. P. Liversidge, vice-president of the Philadelphia Electric Company and printed in this issue of ELECTRICAL CONTRACTING.

THIS is not the first time that cooperative marketing has been proposed to the electrical industry. Both the Wiring Sales Conference and the Industry Sales Conference some six or seven years ago brought forth some very definite recommendations.

However, the time was not one to impress top executives with the need for cooperative marketing. Business was increasing rapidly and the industry very prosperous.

In an era such as immediately preceded the depression it is very difficult to convince an executive of a company that is expanding rapidly, is rolling up large profits and is enjoying unlimited credit, that he needs the cooperation of others. It is equally difficult in such times to convince one group in an industry that it needs to work with the other groups.

Now all that is changed and the "stuffed shirts" of yesterday have lost their ego.

The electrical industry is mutually interdependent, but never has it been more apparent than now. The power companies now know that when the sales of manufacturer, wholesaler, contractor and dealer show a severe shrinkage, the consumption of energy falls off. Likewise the other branches of the industry know that unless energy sales are maintained their businesses suffer. The wholesaler and the manufacturer now know how good was the construction business of the contractor.

Every flatiron that is sold, every additional outlet that is installed, every motor that is repaired, means not only a sale by the dealer or the contractor, but it means more energy to be sold and an order for some wholesaler and some manufacturer.

Why, then, isn't this the right time, when everybody needs business, to recognize this interdependence and take advantage of its potentialities?

IN the previous plans for cooperative marketing the approach was national sales promotion. Mr. Liversidge proposes a local approach with national direction.

There is much to be said in favor of such a suggestion. In the first place it is more positive in that it creates a demand only where selling is active. It is quicker. It requires no huge sum of money to be raised nationally before work can be started. It is more flexible in that it can be quickly changed or modified as conditions or localities warrant. It can be made to fit local needs.

IT is the suggestion of Mr. Liversidge that the program be worked out in a joint council between representatives of the four national associations of utilities, manufacturers, wholesalers and contractors. Such a plan should make for unity of purpose and secure the cooperation of all worthwhile units of all groups.

ELECTRICAL CONTRACTING sees in this proposal not only improved marketing of electrical products but what is also important, improved trade relations. When the several branches of the industry appreciate their mutual interdependence there will be less tearing-down and more building-up, which in the long run, of course, means more and better business.

It is to be hoped, however, that the four national associations respond quickly to the suggestion of Mr. Liversidge and start right away to effect some kind of action.

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NUMBER 6

electrical contracting

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APRIL
1933

What we need today is more guys who don't take anything for granted, such, for instance, as a certain red-headed World War Lieutenant, known as "Scrappy" Burke. In civil life this buckaroo is a go-getting salesman, and the only thing he ever took lying down was a good night's sleep.

Burke commanded the First Platoon in C Company of an American infantry regiment. When his outfit took over a part of the line in the Vosges Mountains, the French told the officers it was a "quiet sector" and that there would be no fighting. Everybody swallowed it except Burke. "That's a lot of Pollyanna," sezzee, "It might be quiet now, but when these hoodlums of ours start playing Duck-on-Rock with every Fritz who sticks his head up, it'll sound like a monkey-cage when you throw in one banana."

With that off his chest, he got busy. Every night, while the other officers contented themselves with bracing a chair under the kitchen doorknob and telling the sentries to stay awake, Burke was out in No Man's Land with a picked patrol, studying his territory. He learned the meaning of each little sound from across the way; how long it took to crawl from here to there, and just which routes were used by the enemy patrols. In daytime he and his sergeants used their glasses till they knew exactly what would happen when business picked up and the Germans began shopping around.

Nothing happened for a week, and Burke almost thought the drinks were on him. Then, just before dawn on a Sunday morning, his front line signalled: "Enemy raid," and cut loose with everything they had. The raiders, checked by this alert defense, swung 50 yards to the right and billygoated their way into the front line trenches of the astonished second platoon. Burke's big chance had come. Slipping up his favorite gully with a score of his bulldogs, he tore into the enemy's rear, killed enough of them to break up the attack and snatched eight prisoners. All this was the result of study and preparation.

Let's take a leaf out of Burke's book and a peep over our own parapet at the industrial plants. They're pretty quiet now, and not belching much smoke, but oh, boy! what a smear of electrical work they need! There are scads of motors to be repaired and replaced, lighting systems crying for attention and many other changes for economy and efficiency.

Some of this business can be secured at once, and while soliciting there is a golden opportunity to study the customer's needs. If he can't afford an installation at present, sell him on your service and be ready for the payoff. Get a real picture of his set-up, his buying habits and what he will do in the line of expansion when he is able—the things he wishes he could do now. Above all figure ahead just what you will need and what you must do to beat the other boys to the orders when the gong rings.

Knowing which way the cat will jump is two-thirds of the battle.

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New Code Changes

The Electrical Committee, N.F.P.A., met in New York City on March 14-17 in the preparation of the biennial revision of the National Electrical Code for the 1933 edition. Fifty-five representatives and alternates were in attendance. The following are some of the high spots in the accomplishments of the meeting:

Interim Revision Procedure

The report of the special committee on Interim Revision Procedure was approved, with certain amendments, which provides substantially as follows:

Proposals for Interim Revision may be submitted to the Electrical Committee at any time, and shall be referred by the chairman direct to the appropriate article committee for report. Such article committee shall report its recommendations within sixty days, based on a majority vote of the article committee. If such report is favorable, the Electrical Committee shall proceed to letter-ballot, with sixty days allowed for such letter-ballot, and approval shall require a favorable vote of two-thirds of the Electrical Committee membership.

Specific amendments so adopted shall be announced by the chairman of the Electrical Committee as "Tentative Interim Amendments of the National Electrical Code, approved by letter-ballot of the Electrical Committee and (recognized or issued for consideration) in the administration of the Code." (Actual wording to be determined by the board of directors of N.F.P.A.)

Bare Neutral

The special committee on the use of bare neutral in interior wiring rendered a report which stated a conclusion that any hazards involved in the use of bare neutral conductor up to outlet points under the conditions specified in this report, do not appear greater than those existing with types of wiring now recognized in the National Electrical Code from the conditions found in actual installations. These conclusions were not subscribed to by all the members of the committee, a supplementary statement being that such conclusion could be assumed only "by taking all necessary precautions."

The report was received and the special committee was continued with instructions to prepare a draft of recommended rules for bare neutral as a method of wiring, for consideration of the Article 5 Committee, to be reported back next year. A motion that the Electrical Committee issue recommendations to electrical inspectors that they permit trial installations of bare neutral was not accepted, but action was taken to issue a statement that the Electrical Committee in view of the report, believes that it will be proper for electrical inspectors to permit trial installations under controlled conditions.

Article 1.

A revision of the definition of "service" wherein each element of the service is defined. This is an attempt to so specify service equipment that it will mean a certain thing.

A new definition to be known as "Raintight." This word will be used wherever it is required that "water will not enter as the result of a beating rain."

Article 3.

303-f: Details different types of clearances for overhead wires.

Article 4.

404-g: Electrical metallic tubing is approved for service conductors on the exterior of building walls and entering buildings. It is also required for the first time that where conduit or metallic tubing are used for service, the raceway shall be arranged to drain.

404-e: Permission to use a bare neutral service entrance conductor is extended to include polyphase systems and conductors contained in electrical metallic tubing, or service entrance cable.

405-b-1: The provisions of this paragraph originally applied only where there was a meter on each of several services. In the new Code the word "meter" will be eliminated.

405-b-2: Under certain conditions, the same as in the present edition except as mentioned below, both the service switch and service fuses may be omitted. The condition "provided that the capacity of the service conductors is equal to the sum of the settings of the individual circuit breakers" is omitted.

405-h: A new sub paragraph, 4, has been added to except certain measuring and control apparatus such as potential coils of meters and control circuits of time switches ahead of the fuses, providing all wires are in conduit.

405-i-3: Revised to permit meter ahead of service equipment up to 100 amp. in place of previous 60 or 70 amp. and also to permit meters ahead of service equipment where up to four meters are allowed without a main line service switch as provided in 405-b-1.

Article 5.

503-g-Table 1: Specifications now given for size of service conduit using bare neutrals as follows:

For services only:

2 No. 6 R.C. and 1 No. 8 Bare in 1-in. conduit.

2 No. 4 R.C and 1 No. 6 Bare in 1-in. conduit.

2 No. 2 R.C. and 1 No. 4 Bare in 1¼-in. conduit.

Table 4: Revised to permit one 2-conductor cable in a ½-in. conduit instead of ¾-in. required in 1931 Code. Also requires ¾-in. conduit for two No. 14 single conductor cables instead of ½-in.

507-a: The voltage limits for nonmetallic sheathed cable are raised from 300 volts to 600 volts.

508-h: The voltage limits for metallic tubing are raised from 300 to 600 volts and the size of permissible conductor from No. 6 to No. 4.

508-i: The locations in which metallic tubing is permitted are broadened out.

512-p: A new paragraph to prevent the crowding of wires in outlet boxes. The maximum number of wires permitted to leave branch cir-

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cuit outlet and junction boxes containing wires and joints only are as follows:

Size of BX	Shape of Box	No. of Wires No. 14	No. 12	No. 10	No. 8
1½x3¼	Octag. or round.	8	6	4	..
1½x4	Octag. or Round.	10	8	6	4
1½x4	Square	12	10	8	6
1½x4	11/16 Square	16	12	10	8
2⅛x4	11/16 Square	20	16	12	10

516: The committee approved Section 516 to permit two-wire non-metallic assemblies to be used as extensions to existing convenience outlets only, to be run on walls or ceilings and confined to room of origin.

Article 6.

602-d: This is one of the most important changes made. It requires that individual rubber covered wires, unless lead-covered, shall be covered for their entire length with a braid which is both flame retarding and moisture resisting.

613-d-18: The table has been changed to give a more liberal demand factor on residential electric ranges up to fifteen ranges, starting with 80 per cent for one range, 75 per cent for two, etc. Above fifteen ranges the table is the same as in the 1931 Code.

Article 7.

703-p: Cabinets housing lighting panelboards shall not contain more than 80 branch circuit wires. (See also 1303-h.) A section of a sectional cabinet is to be considered as a separate cabinet.

Article 8.

801-d and *804:* Non-tamperable plug fuses and cutout bases are recognized for the first time. They are permitted in two ratings, 0-15 amp. and 16-25 amp. Fuses, bases and adapters of various manufacturers shall be interchangeable.

808-a: Rules for determining the sizes of power feeders and their overload protection are simplified.

808-b: The motor wiring and protection data now covers synchronous motors.

Article 9.

This article has been completely revised editorially and rearranged in a more logical manner so that information may be more easily looked up.

907-e, 908-h: A single buried or driven grounding electrode and a single grounding conductor may be used for grounding to both the system and the equipment if the neutral of the secondary is grounded at two other locations. The common grounding conductor may be bare or insulated and may be attached directly to the surface on which it is carried.

909-c: The sheet metal type of ground clamp is no longer approved.

909-k: This paragraph permits the interconnection of the lightning arrestor grounding conductor with the neutral of the secondary system "provided the secondary has elsewhere a grounding connection to a continuous metallic underground water piping system in addition to the direct grounding connection at the arrestor."

Article 10.

This article has been revised to specifically provide for both a controller and disconnecting means for every motor.

1004-d: Provides that except for small motors, that a switch used as motor controller must be of the motor circuit type rated in horsepower.

1005: Also requires that for motors between 2 and 50 h.p. a switch used as a disconnector must be of the motor circuit type.

Article 12.

1201-b: The general use of knife switches is limited to a capacity of 1200 amp. at 250 v. and 600 amp. at 251-600 v.

Article 13.

1303-h: No panelboard shall have more than 40 single-fused or 20 double-fused circuits. For lighting panelboards the rated capacity shall not exceed 200 amp.

Article 16.

1605: This gives specifications on immersion type electric heaters to remove the hazard of portable water faucet heaters and other immersion type heaters.

Article 20.

This is a new article with the title "Wiring Installation Design." It contains old section 500, the feeder rules formerly in section 613, and branch circuit rules formerly in section 807 and 1602. The five types of branch circuits recognized in the present Code are replaced by two types, 15 amp. branch circuits and special appliance circuits. It provides additional recommendations for minimum adequacy in residences of over 400 sq. ft. floor area as follows:

2011: It is recommended that in every kitchen, dining room, breakfast room, living room, parlor, library, den, sun-room, recreation room and bedroom where any outlet is installed in such room, a sufficient number of receptacle outlets shall be installed to provide that no point on the wall, as measured horizontally on the wall, shall be more than 15 ft. distant from such an outlet. At least one receptacle outlet shall be installed near to each permanently installed laundry tub or set of such tubs.

2012: It is recommended that in each space intended for the use of a single family, one or more special appliance circuits shall be installed and such circuit or circuits shall supply all receptacle outlets in the kitchen, pantry, dining room, and breakfast room and adjacent to permanently installed laundry tubs, except that any such outlet may be supplied by an individual branch circuit. In addition to supplying receptacle outlets, the special appliance circuit may also supply one or more permanently connected appliances in these rooms and may also supply an electric refrigerator or other appliance operated by a motor not larger than ½ h.p., but no larger motor load or lighting fixture other than those here specified shall be supplied by such a circuit.

2013: It is recommended that house wiring installations be laid out on the basis of one branch circuit per 500 sq. ft. of floor area in addition to the one or more special appliance circuits installed.

2005-b: The use of a common neutral for branch lighting circuits is permitted.

Article 31.

The recommendation for metallic tubing in elevator shafts as included in the article committee report was not accepted.

Article 32.

3203-b: Service entrance equipment, switchboards and panelboards may be installed in Class I hazardous locations if of a type approved for use in explosive atmospheres.

3203-c: Wherever conduit terminates in an enclosure in which arcing or sparking is likely to occur, or wherever a conduit leads from a hazardous to a non-hazardous location, the conduit shall be sealed off with a sealing compound of not less than ⅝-in. thickness.

Article 41.

This is a new article on emergency lighting. It does not require any emergency lighting but specifies how the wiring shall be done where such lighting is required by law.

Article 50.

The rules for Gas Tube Systems are transferred to Article 38.

5010-a: New rules specifying clearances between conductors and working spaces in transformer vaults, etc.

Article 60.

The rules for signal systems are much improved by setting up four classes of circuits, according to the voltage and fuse protection.

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Co-operative Marketing*

By H. P. Liversidge, Vice President
Philadelphia Electric Company

DURING this "gold-rush" era, mass production held the center of the stage while distribution was relegated to a minor part in the show. Anyway, the job of selling did not require such a great amount of attention. With a hundred million people scrambling for a place in a buyers' line, why the need for concern? Then, almost over night, that great army of consumers disappeared. Now business faces the herculean task of combing the highways and byways in search of the buyer who is the all-important factor in our realm of trade. That's the job ahead of us, and if I'm not mistaken, it will continue to be the job for a long, long time to come.

This certainly is not a problem for the theorist; it is a problem which will demand a knowledge of markets and people far superior to the established methods heretofore employed. It will require the originality and perseverance of trained business minds. It will demand the discarding of the out-moded customs of a past era—the adoption of new ideas —ideas that are abreast of the new era of political, social, and economic life into which we are entering.

Basically, these newer methods will be built around the principle of co-operative marketing and just as in the past we devoted our best thought, time and effort to the development of a great production machine, so for the future our best endeavor must be directed toward the building of a sound economic distribution machine. In my opinion, no industry is in such a unique position to develop such plans quickly and effectively, as the electrical industry. Already we have a background of experience in intelligently-directed local association work that has proven the advantages which can be obtained. Yet, notwithstanding the successful experience of a limited number of local associations during the past twenty years, there exists a relatively small coverage of our national market. We, therefore, may properly ask the question, if a few localized groups are effectively administering their sales programs on such a co-operative business, why has this principle not been more generally applied? On this point, one opinion is probably just as good as another. Yet broadly speaking the real reason most likely lies in the fact that neither from a national standpoint, nor a local one, for that matter, have we been in a position to overcome the obstacles of exaggerated individualism and misunderstanding. These are the things that have blocked our progress toward the widespread application of co-operative marketing in the past; they are behind us, however, and the road ahead seems cleared of such obstacles as might retard the rapid development of co-operative plans.

National vs. Local

Let me ask another question. May it not be also possible that those who might have developed the broader phases of co-operative marketing gave so much attention to the national picture that they failed to recognize the value of the local unit as the basic foundation on which the entire co-operative structure must be built?

Just what do we mean by a national sales problem, anyway? Isn't it merely the integration of a million and one local sales problems? The address of the individual customer in this nation is not Mr. and Mrs. John Q. Public, U. S. A. This individual to whom we must direct our sales effort has a most specific and definite address; and it is on that localized address we must concentrate our attention.

I have been told by some that my views are entirely too local, and without disputing this point, I would add that in my humble opinion the views of certain others give evidence of being entirely too national. The point I wish to make is that the firing line in the further development of electric industry sales is our local territories. There is where the business is done and there is where we must concentrate our efforts.

On the other hand, as we develop the local picture of co-operative sales, we need the strongest kind of co-ordinating support nationally. I do not, therefore, wish to depreciate in the slightest the need for a national viewpoint in this entire picture; rather I would consider it a most important and necessary part of the whole, always recognizing, however, the local associations as the foundation on which to build. If we organize properly, the local co-operative efforts will automatically play an increasingly important part in the details of our sales campaigns. It probably will result in the readjustment of sales and advertising costs as between national and local programs with greater emphasis on the local requirements. Not that I would minimize the importance of promotional advertising on a national scale —this is a prime requisite—but I would make certain that necessary weight was given to the advertising activities in the local field.

Where is all this leading, you may ask. What has been said that does not apply to your own local methods of operation? The point to which

*An address delivered before the Electrical Association of New York, Inc., March 15, 1933.

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I am leading is the fact that if we are to secure the future volume of sales we need, then what is being done in New York, Philadelphia, Chicago, Cleveland, St. Louis, and other centers of population today must be expanded quickly and effectively, duplicating in all parts of the nation that which is being accomplished in these several communities.

National Associations

To accomplish this, there is need for national and sectional co-ordination and direction, and it is this phase of the problem which must be given especial attention. I can readily vision a completed picture organized on sound business principles that would bring into full unity of action all interests of our four major national trade organizations with direct lines of contact through state or district organizations to the local associations, thus providing a distribution machine which would correlate and augment to the fullest the performance of every local unit in the program of ultimate consumer sales. By this means we would gain the advantage of national planning, plus local performance; local knowledge of conditions, local flexibility and local understanding, and, what is more to the point than anything else in my opinion, an effective national machine built for the specific purpose of increasing sales and reducing the total costs of distribution.

Care Needed

I have lived close enough to the problem to know that the basic requirement for success is a successful local association. Everything that has been suggested is built around this fact. I also realize that in embarking on such an enlarged plan of co-operative effort we must studiously guard against the enthusiasm of extremists, for it is quite conceivable that collective action might reach the point of complete subordination of the individual which, in turn, would defeat its very purpose. Of necessity, therefore, a comprehensive national plan of this character must be developed with the greatest care, each step timed to synchronize with the growth of understanding of participating groups. Furthermore, we must insure definitely against the uncertainties of costly experiments for the problem is too important and serious a one in these times for experimentation. It is my belief, however, that the electrical industry has one of the greatest opportunities of its existence to lead the way to more efficient methods of selling through the medium of co-operative marketing. The stage is set for what might readily prove to be one of the most spectacular performances that the industrial world has ever seen.

Besides all this, we know with a certainty that collective action, directed toward market development, timing of sales programs, checking and elevating standards of business ethics, with general agreement on and adherence to equitable trade policies, all are fundamental in the development of increased distribution of commodities at reasonable prices to the consumer and at costs which permit a fair margin of profit to all.

If to these we can add inspirational and forceful leadership, and intelligent understanding of each other's problems through the exercise of frankness and fair-dealing, the main difficulties in the path of co-operative action are removed. The way is then cleared for the performance of the individual who has it in his power to determine what share of the business he will secure for himself.

Start Now

With these fundamentals before us, with the need for greatly increased volume of business in every branch of our industry more apparent now than ever before, with the necessity of doing this job quickly and economically, what should deter us from taking those initial steps that appear most obvious now?

Surely it does seem pertinent to ask each other, why don't we do something about it? Where can one find an individual in business today who is not struggling with the discouragements of the defensive battle we are waging? Who is not engrossed in the problem of shaping this daily performance to meet the persistent issues of a declining market, grasping at expedients, living in an atmosphere of day-to-day existence? Who does not recognize the need for unity of thought and action, and who will not welcome any measures that will assist the individual in a more orderly development of sales programs?

Those of us who have had experience in local co-operative efforts during these trying times recognize the great bulwark to morale alone which has been afforded by this work. Wherever we turn, the evidence gives weight to the arguments for a broader application of these local principles to a complete national coverage. Surely there is nothing theoretical about this, and it would certainly seem that we need only a little initiative and courage to start such a program.

Mutual Problem

It may be that the difficulty lies in the fact that each interest is waiting for the other. In the last analysis, it cannot be regarded as the problem of the National Electrical Manufacturers Association alone, nor is it the problem of the National Electrical Wholesalers Association, the National Electrical Contractors Association, nor the Edison Electric Institute. It is a problem in the solution of which each unit must join on a mutual-interest basis.

Coordination

To accomplish this we need as an initial step the formation of a co-ordinating council among our national trade bodies. With this body as a nucleus, we are then in a position to create a national bureau for sales direction and sales promotion. There is left only the comparatively simple details of completing the tie between this national body and the local association through the proper organization of state or district groups.

Picture, if you please, the possibility of such an organization in its relation to national planning and the resultant unification of action. The manufacturer certainly needs this help; likewise the wholesaler, the local contractor and dealer, and surely the local electric operating company —all will feel the impetus to greater sales through the functioning of such a plan of co-ordination.

If the award for co-operation recently tendered me is not the signal for my graceful retirement from the scene, I certainly will keep going toward the ultimate accomplishment of these objectives. Surely no harm can be done in making the attempt to obtain from those who are guiding the destinies of our four national trade associations their support in the furtherance of this important cause. And I am optimistic enough to believe the answer will be, "Yes; when shall we begin?"

UMI

Labor's Views on the New Economics

by
G. M. Bugniazet
International Secretary
International Brotherhood of Electrical Workers

In our January issue an editorial entitled "The New Economics and Labor" presented a number of factors to be taken into consideration with respect to future wage rates and employee training and suggested the organization, through a section of the National Electrical Contractors Association, of employers of union wiremen to adequately represent the electrical contractors in future negotiation with organized labor. This article is in response to our invitation to discuss the proposals contained in the editorial as they may be practically achieved from the point of view of the I.B.E.W.

—Editor.

AT the outset it appears certain that everyone concerned with the electrical industry will agree that rapid change is to be the habit rather than the exception today, and tomorrow. This irritable shifting of forces should not be irritating to men used to working with the invisible shifting forces of electricity. What fears can the electrical dollar inspire in electrical workers of all grades and sizes? Technocracy anymore than the electronic tube fails to strike terror in the minds of men inured to the invisible order of electricity. This is no time then for rigidity of mind and for refusal to examine new ideas and new policies. Least of all, is it time for overlooking the most trifling fact about the changing economic order or the shifting scenes of the electrical field. If we examine facts, we should be willing frankly to state our attitudes and convictions in regard to them.

The editor of ELECTRICAL CONTRACTING appears to have the happy faculty of facing facts frankly without arousing animosities. It is in response to an editorial appearing in the January number entitled "The New Economics and Labor" that I am moved to state labor's reactions. It is asked, when the six-hour, or four-hour day and the thirty-hour or twenty-four-hour week arrive in the industry, shall electricians be paid the same wage, and in the same way? Before this can be answered logically, consider for a moment what the wage scale is.

The hourly wage scale to any member of organized labor, it should be known, is something more than a wage scale. It is a flag around which the union has rallied. It is a measurement of achievement. As the electrical contractor feels a glow of inner satisfaction when he views his new V-16 motor standing before his door, so the electrical worker feels a glow at his hourly wage scale. It is an outward sign of solvency. It should be recalled also that the wage scale has arrived out of a long period of struggle, often as a result of strikes, often as a result of economic pressure. It is not likely therefore that human beings are going to look at this symbol of achievement as something that is to be tossed aside easily, or are going to view it merely as an instrument by which one adapts himself to a changing economic situation. If conditions should come about in the electrical industry, where wage scales are arrived at through negotiation on the basis of r e s e a r c h data and through cold deliberation by reasoning men, it is likely that the scale may then be regarded not as something sacred, but as a super-tool for use in a functional way. But as long as wage scales are established by struggle, they will take on unusual meanings, and be defended by struggle. Though these things are so, the International Brotherhood of Electrical Workers has faced the need of viewing the wage scale more realistically. During the last few years in localities where employers and our locals cooperated for the benefit of the industry, the scale has been adjusted on different classifications of work to get this work for our members. This, I believe, is the beginning of a rational treatment of the question of wages, and opens the door to a flexible scale to meet non-union competition. At this point, it should be remembered that the hourly scale has never prevented contractors from recognizing exceptional skill on the job. The hourly scale is only a minimum.

And while we are discussing this question of wages, it is just as well to suggest that electrical workers nor any other section of organized labor, nor any section of the great mass of American workers, are likely to be content with a disproportionate share of produced income—when economists, engineers and statesmen declare that the chief factor in the present depression is depleted purchasing power and mal-distribution of income. It is not likely that the victims of these maladjustments are docilely going to concur in permanent wage-cuts. We must look sharp that we do not allow the present depression psychology to shape our notions about the electrical industry of tomorrow.

The International Brotherhood of Electrical Workers is in strong position to equip its members with technical education. It has always been strong for this part of its function. One of the fundamental tenets of its constitution stresses education, and the necessity for training not only apprentices, but providing post graduate opportunities for journeymen has been given strong impetus during the last few years. In some cities,

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it has established its own schools. This will be continued. The goal is to have the best equipped craftsmen in the world in the International Brotherhood of Electrical Workers.

It is easily seen that meeting changing problems of the industry with intelligence, the creation of new attitudes in regard to wages, in regard to skill, depend in a large part upon joint activities of union and employer for their own interests and the interest of the public. It is unthinkable that this function can be really efficient unless the employer is organized in an association of his own making. To continue in a vein of frankness, we may well say that union electrical workers look with dismay and amazement at the unorganized condition of electrical contractors; and where organization is attempted they look with consternation and bitter and ironical humor at the attitude of some electrical contractors toward their organization. Every union man has learned that an organization is a kind of super-entity, another personality apart from the individual members,—which has a past, a present, and a future, a history and traditions, and an on-going life apart from the individuals. To preserve the life of such an organization means sacrifices on the part of individual members. It is true that the union has selfish, even mercenary members who merely belong to the union to use it. But these are not the ones who built or perpetuate the union's life. These are only the parasites on the keel of the good ship Organization. All forms of organization have these barnacles.

Probably in the rough-and-tumble of competitive business the individualism of the employer grows fat by what it feeds upon. But it must be seen that this individualism is not good material for organization purposes. None of the problems of the new day of the electrical industry are going to be fully and intelligently met by individualism; until they are met by research investigation, conference and parley, by wise consideration of the needs of both the workers and management, as well as the community—in short by organized intelligence—they are not going to be met at all.

The union is not dismayed by the rapid changes in the industry or in our economic life. It has re-equipped itself during the last three years with greater flexibility and greater adaptability. It finds quite natural the need for education and re-education of its members, and it is growing more and more conscious of the value of research and science in meeting its every day problems. It believes that its employers would help themselves, would help the union and the industry to take to heart these objectives and equip themselves through organization.

To answer categorically,

1. Will the union adjust wage scales to changing conditions?
   Yes.
2. Will the union meet the challenge of shifting frontiers of technical knowledge, and equip its members adequately?
   Yes.
3. Will the union encourage employer organization?
   Yes.

When one considers the literally staggering potentialities in the electrical industry, when one exercises a little imaginative energy upon these possibilities, he becomes aware that all industry is to become electrical, and one wonders about the inability of individuals to measure up to opportunities. But should we fail to do it, others will take our places, who can, and will.

WIN
one of these
CASH PRIZES
for the best suggestions on
How To Sell
Adequate Wiring

ELECTRICAL CONTRACTING is looking for practical suggestions as to how adequate wiring can best be sold and for such suggestions is offering to its contracting subscribers five cash prizes aggregating $50.00.

The suggestions will be judged solely on the practicability of the suggestions and not on literary merit. The manuscript may be typewritten or longhand, but only one side of the sheet should be used.

No limitation is placed upon the length of the manuscript.

The original date for the closing of the contest, which was announced last month, has been extended two weeks.

All suggestions must be mailed not later than midnight of April 24, 1933, and should be addressed to—

Editor
Electrical Contracting
520 North Michigan Avenue
Chicago, Illinois

For the suggestion voted best by the judges a cash prize of $25.00 is offered. For the second best suggestion a cash prize of $10.00 is offered; for the third, fourth and fifth $5.00 each.

In case of a tie, all tying contestants will receive equal awards.

All suggestions submitted will become the property of ELECTRICAL CONTRACTING, which reserves the right to publish such of the suggestions as it may desire.

JUDGES

L. W. Davis, General Manager, National Electrical Contractors Association.

Arthur L. Abbott, Uniform Ordinance Department, National Electrical Manufacturers Association.

S. B. Williams, General Manager and Editor ELECTRICAL CONTRACTING.

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What Does Adequate Wiring Cost?

By Arthur L. Abbott

A METHOD of wiring dwellings designed to provide a high degree of adequacy, but drawn up without regard for costs might provide for wiring that would be fully adequate in every sense of the word, but very likely would have no practical value because the installation cost would be prohibitive. In working out such a method costs must be carefully considered at every step and the method must eliminate all unnecessary expense, otherwise it cannot be sold to the public and will fail to serve any useful purpose. The method having been developed, a complete study of costs is a necessary preliminary to the successful promotion of the method.

Until recently, adequate house wiring has meant to the electrical industry merely a sufficient number of outlets, with possibly a large enough service to carry a range, but within the past two years a radical change has taken place in these ideas. The consensus of those who have given serious attention to the problem is that in order to be fully adequate, a house wiring installation must represent an engineered job, which means a job carefully laid out for the maximum ultimate economy and efficiency.

An engineering solution of the house-wiring problem is presented in the Joint Industry Conference Adequacy Wiring Standards for Residence Buildings as explained in the March issue of ELECTRICAL CONTRACTING.

Obviously, a local group cannot intelligently plan any activity to promote adequate wiring and few adequate installations, if any, can be sold until costs have been investigated so that we know how much more an adequate installation will cost than an ordinary installation and how this increased cost is divided between the various parts of the job.

A specific example of the application of the Standards has accordingly been investigated in considerable detail. The house chosen as the subject for these studies is a residence built in Westchester County, New York, in 1930. Plans of the basement, first and second floors are shown on page 13. It is estimated that the house could be built at the present time for about $14,000. The building is approximately 30 ft. by 36 ft., two stories high, and contains eight rooms, or nine if the breakfast room is counted. A part of the basement space is utilized as a garage.

In the following discussion, quantities of labor and material are estimated quantities except as otherwise stated. At the time when this investigation was undertaken, no houses had been wired according to the new standards, hence no cost records of such installations were available. The actual cost record was obtained, however, for the house here discussed as it was actually wired. For the layout in conformity with the Standards, the material quantities have been quite accurately determined from a detailed layout, and the labor costs have been carefully estimated, being based upon a large amount of data previously secured.

The Layout

In conformity with the Industry Standards, the plans show the following equipment:

27 ceiling outlets
19 bracket outlets
39 convenience outlets
26 single-pole switches
1 momentary-contact switch
10 3-way switches

Total 122 outlets and switches.
1 electric range circuit
1 electric water heater circuit
2 circuits for air heaters in bathrooms
1 oil burner circuit

The total floor area of the first and second floors, computed from the outside dimensions of the house and exclusive of the open porch, is 2,100 sq. ft. According to the rule calling for one branch circuit per 500 sq. ft., five circuits are required for the lighting and for the convenience outlets outside of the heavy load area. Two additional circuits are required to supply the convenience outlets in the latter area, which includes the kitchen, breakfast room, dining room and laundry.

In order to test the circuit rules, a circuit layout was made on the plans, using great care to make sure that: (1) outlets in every important room were supplied by at least two circuits, (2) the outlets were equally divided between the five circuits, as nearly as possible. Otherwise, the circuits were merely run so as to show the greatest possible economy in the use of material.

It is the intention that the 500 sq. ft. per circuit rule shall result in a total connected load not greatly exceeding 1000 watts per circuit. A load based upon liberal wattage allowance was set down opposite each outlet, and the total load per circuit was computed from these figures. The heaviest load on any circuit was found to be 925 watts and the smallest circuit load was 780 watts, which is good evidence that the circuit rule produces the intended result. The total load on the five general-use circuits was computed in this manner as 4,190 watts or practically 2 watts per sq. ft.

It will be noted that the layout shows no bracket outlets in the dining room, living room or bed rooms. These were purposely omitted in order to see what effect the addition of a number of such outlets would have on the circuit loading. Sixteen bracket outlets were then

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located and each was considered as a load of 50 watts. By connecting these outlets to the most convenient circuits without re-arranging the entire layout to keep the outlets equally divided between the circuits, the load on one circuit was increased to 1,175 watts, which is well within the safe limit, while the load on each of the other circuits was still below 1,000 watts. If the outlets had been divided equally between the circuits, the heaviest load on any circuit would have been 1,075 watts.

As a further test to determine what might happen under the most unfavorable conditions, it was assumed that all of the nine outlets carrying loads greater than 50 watts were to be supplied by one circuit, this circuit also to supply eight 50-watt outlets, the total number of outlets per circuit for this layout being 17. The calculation showed that the total circuit load would then be 1,850 watts, or just slightly over the limit for a 15-amp. 115-volt circuit. Of course, it is inconceivable that the most incompetent wireman would take the pains to run one circuit all over the house in such a manner as to pick up every one of these particular outlets.

Service

Coming now to the service, the calculation of the required capacity is as follows:

Lighting and portable appliances:

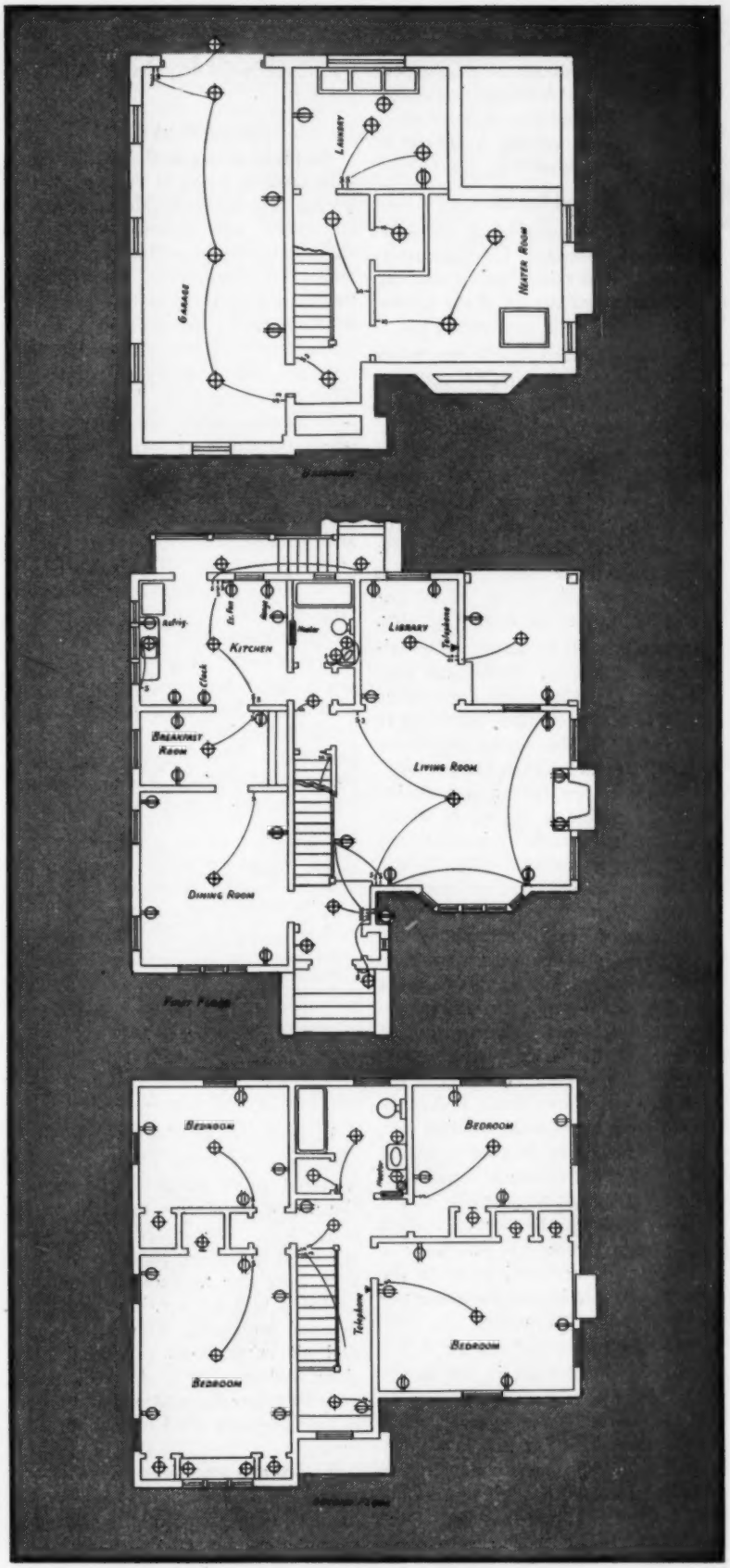
2,000 sq. ft. at 2 watts per sq. ft.	4,000 watts
100 sq. ft. at 1 watt per sq. ft.	100 watts
Fixed allowance	1,000 watts
Total	5,100 watts

Fixed appliances:

Range	8,500 watts
Water heater	3,000 "
1 air heater	1,200 "
1 air heater	1,500 "
Oil burner	1,000 "
Spare circuit	1,500 "
Total	16,700 watts
At 70% demand factor	11,690 watts
Total load for house	16,790 watts

At 230 volts the current corresponding to 16,790 watts is 73 amp. As this is only slightly above 70 amp., a 70-amp. service will be satisfactory, or three No. 4 service conductors and a 100-amp. service switch.

At the present time the National Electrical Code does not specify any demand factors to be applied to appliance loads in single dwellings, the reason undoubtedly being that at the time when the Code demand factor data were compiled, no urgent need had developed for consideration of



this special case. There is little question but that it is perfectly safe to assume a demand factor of 70 percent for a load consisting of a range, a water heater and two or more other appliances each having a rating of 1,200 watts or more.

Cabinet Location

The point designated by the central station company for the termination of the service conduit was the right-hand front corner of the house, as indicated on the basement plan.

In this standard layout we must provide for a load of 16,700 watts in fixed appliances that are quite closely grouped around one location. For economy in plumbing, the kitchen, laundry and bath rooms are usually located as closely together as possible, as is the case in this house. An electric water heater can be placed at the most convenient and economical point, and in this house would undoubtedly be located in the laundry.

It would seem to be perfectly evident that the most economical plan is to run a feeder from the service switch box to a cabinet located near the center of the heavy appliance load. A careful estimate shows, however, that if the feeder is installed in rigid conduit, a saving of about $4.00 could be made by locating the branch circuit cabinet close to the service switch box and carrying all circuits back to this point. The estimated cost of flexible conduit for the feeder run is about $4.00 less than rigid conduit, so that in this case the total cost is the same for either location of the cabinet. The location of the cabinet near the load center would result in a lower voltage drop in the appliance circuits and makes a cleaner and more workmanlike job, and the difference in cost being of no importance, the central location of the cabinet should be adopted. If the location close to the service switch were chosen, it would be necessary to add 80 ft. of armored cable to the quantity covered by the allowance per outlet as given below.

The location of the cabinet shown on the basement plan is not necessarily the best; it might equally as well be located at some other point in the basement or on the first floor. Undoubtedly the preferable location is in the kitchen, though this would add a few dollars to the cost of the feeder run. The feeder is to carry the entire load and therefore should be of the same size as the service, i. e., three No. 4 conductors in 1¼-in. conduit.

Circuit Work Costs

As previously stated, complete records were at hand of the cost of the wiring as actually installed, including 69 outlets and switches. The arrangement of the outlets as installed was not considered satisfactory, therefore a different layout was made on the plans, using the same number of outlets. Circuit runs were laid out and the quantity of cable required was scaled off. Finally a complete layout with 122 outlets was made on the plans and the cable quantities estimated.

The following data are based upon the studies made on this installation and comprehensive studies made some years ago of the costs of labor and material for the same class of work.

The computation of the base figure per outlet is given below. All prices used for material are prices obtained in New York City in April, 1932. Labor is assumed to cost $1.00 per hour. The material and labor prices must always, of course, be adjusted to the current prices in each locality.

Outlet Costs	Price	Cost
12 ft. No. 12 2-conductor armored cable	$34.50	$0.41
2 ft. No. 12 3-conductor armored cable	46.00	.10
1 Outlet box		.12
1 Box support		.11
2 Box connectors, clamp type, with locknuts	2.80	.06
Miscellaneous material		.03
Labor—.4 hour	1.00	.40
Inspection fee		.05
Total		$1.28

Figures obtained in January, 1933, showed a reduction in the price of armored cable which would reduce the above outlet cost to $1.14 or 14 cents less. The lower prices were not used in the computation because they were due to slack demand and probably will not continue when the demand increases. The outlet costs and all other costs presented here should always be rechecked, using current prices for material and labor, before they are used in making estimates.

The above quantities of cable apply to a job that includes only the ordinary number of outlets, such, for example, as the actual installation in the house under discussion, which included 69 outlets. It is evident that as more outlets are installed, somewhat less cable will be used per outlet. The difference is small, however. The studies on this house indicate that where a fully adequate number of outlets is installed, the length of cable required per outlet is reduced by 2 ft. This makes a difference of 7 cents in the total cost per outlet.

To obtain the cost of a switch or convenience outlet, the cost of the switch or receptacle, the plate and the additional labor for installing the device must be added to the above total.

Single-pole Switch:	
1 Switch	$0.47
1 Brass plate, .060	.12
Labor—.2 hour, $1.00	.20
Cable and box	1.28
Total	$2.07

3-way Switch:	
1 Switch	$0.60
1 Brass plate, .060	.12
Labor—.2 hour, $1.00	.20
Cable and box	1.28
Total	$2.20

Convenience Outlet:	
1 Duplex receptacle	$0.25
1 Brass plate, 0.60	.12
Labor—.2 hour, $1.00	.20
Cable and box	1.28
Total	$1.85

The point may be raised that different quantities of cable and different proportions of 2-conductor and 3-conductor cable will be used for each of these various types of outlets. It is true that there are differences, but the method used here is more simple and more easily checked against actual costs than if these differences are taken into account. Also, different customs prevail in different localities with respect to the use of 3-conductor cable. It is believed that the total quantities computed from the above data will be found very nearly correct.

The total cost of the branch circuit work for this installation may now be computed by using the above unit costs, making a reduction of 7 cents in each case because of the fully adequate number of outlets.

Branch Circuit Totals	Cost Each	Totals
46 lighting outlets	$1.21	$55.66
39 convenience outlets	1.78	69.42
26 S. P. switches	2.00	52.00
10 3-way switches	2.13	21.30
1 M-C switch	2.26	2.26
Total		$200.64

Cost of Services

A few simple calculations show that for a large perecentage of all single-family houses, one of the three following service capacities will be required if the house is wired according to the Standards: (1) No. 4 service conductors and a 60-amp. switch, (2) No. 4 conductors and a 100-amp. switch, or (3) No. 2 conductors and a 100-amp. switch. It is desirable to arrive at a cost for each exclusive of the branch circuit panelboard and grounding connections.

Grounding.

The revisions of the National Electrical Code adopted at the March, 1933, meeting of the Electrical Committee of the N. F. P. A. permit the use of a bare No. 4 conductor as a combination system and equipment grounding conductor, provided that the neutral of the secondary mains is grounded at at least two other locations. In nearly all towns and cities the neutral will be so grounded and therefore the estimate of the cost of the service is based upon the use of this method. The new rules will also permit the No. 4 bare wire to be strapped or stapled directly to the surface on which it is carried.

The new rules also specify that if a single grounding conductor is used to ground the service conduit, service switch box and the interior metal raceway or cable armor, these various metal parts must be suitably bonded together. To provide for this bonding the estimate includes three 1¼-in. grounding bushings, one for the service conduit and one for each end of the feeder conduit from the service switch box to the cutout cabinet.

The length of the grounding conductor is taken as 16 ft. which is believed to be a fair average.

60-amp. Service (No. 4 conductors and 60-amp. switch.)

	Price	Cost
20 ft. 1¼ in. conduit galv.	$134.50	$ 2.69
1 1¼ in. service head		.33
1 1¼ in. entrance L		.57
2 1¼ in. L. condulets	.88	1.76
2 Condulet covers	.20	.54
3 1¼ in. locknuts	.02	.06
75 ft. No. 4 R. C. wire stranded	27.92	2.09
16 ft. No. 4 bare wire stranded	18.00	.29
1 Meter board		1.00
1 60-amp. service switch		5.30
2 60-amp. fuses	.22	.44
3 1¼ in. Grounding bushings	18.20	.55
1 Ground clamp		.45
Labor 11 hrs.	1.00	11.00
Total		$27.07

70-amp. Service (No. 4 conductors and 100-amp. switch.)

Since the conduit and wire are the same as for the 60-amp. service, the labor will be very nearly the same and the only items costing more will be the switch and fuses.

	Price	Cost
1 100-amp. service switch		$13.72
2 70-amp. fuses	$0.66	1.32
Total		$15.04

These two items amount to $5.74 in the case of the 60-amp. service, hence the additional cost is $9.30 and the cost of the 70-amp. service is:

	Cost
60-amp. service complete	$27.07
Additional for 100-amp. switch and fuses	9.30
Total	$36.37

90-amp. Service (No. 2 conductors and 100-amp. Switch.)

	Price	Cost
20 ft. 1½ in. conduit galv.	$160.80	$ 3.22
1 1½ in. service head		.57
1 1½ in. entrance L		1.52
2 1½ in. L condulets	1.17	2.34
2 Condulet covers	.37	.74
3 1½ in. locknuts	.03	.09
75 ft. No. 2 R. C. wire stranded	38.72	2.91
16 ft. No. 4 bare wire stranded	18.00	.29
1 Meter board		1.00
1 100-amp. service switch		13.72
2 90-amp. fuses	.66	1.32
3 1½ in. Grounding bushings	22.40	.67
1 Ground clamp		.45
Labor—13 hrs.	1.00	13.00
Total		$41.84

Service Switches. The manufacturers' catalogs list several different types of switches at various prices, the price being dependent upon the features embodied in the design of the switch.

Where the type of switch that must be used is specified by the local central station company there is no choice. The above figures are based upon switches of the "accessible fuse" type, without meter testing equipment, and in the 60-amp. size, designed for the sequence of switch — meter — fuses. If meter test equipment is added, the cost will be increased by an amount dependent upon the type of equipment used.

Feeder

As previously explained the layout calls for a feeder requiring 25 ft. of 1¼ in. conduit. This is of course a variable item which must be estimated for each individual job. A feeder will always be required, but the length of the conduit will vary from a few inches up to a maximum of about 40 ft. in ordinary houses. The estimate for this installation is as follows if rigid conduit is used.

Feeder Costs	Price	Cost
25 ft. 1¼ in. conduit galv.	$134.50	$ 3.36
4 1¼ in. elbows galv.	26.00	1.04
96 ft. No. 4 R. C. wire stranded	27.92	2.68
Labor—9 hours	1.00	9.00
Total		$16.08

The use of flexible metal conduit should be considered for this feeder run. Four elbows are required for rigid conduit and each one is equivalent to nearly 12 in. of conduit, hence to make a fair comparison of costs, 29 ft. of flexible conduit should be figured. The elimination of the elbows saves a considerable part of the labor; the N.E.C.A. Manual of Estimating gives 1.3 hours each as the labor on 1¼ in. rigid conduit elbows. The estimate is as follows:

	Price	Cost
29 ft. 1¼ in. flexible conduit	$172.50	$ 5.00
2 1¼ in. connectors	26.25	.53
96 ft. No. 4 R. C. wire stranded	27.92	2.68
Labor—4 hours	1.00	4.00
Total		$12.21

Panelboard

The standard layout for this house calls for 7 branch circuits for the lighting and receptacle outlets. A spare panelboard circuit should always be provided, therefore a total of 8 single plug-fused circuits is required for this part of the wiring system. For the range, two 50-amp. fuses must be provided. The water heater and two air heater circuits may be 220-volt 2-wire, requiring two plug fuses each, and a single plug-fused 110-volt circuit is needed for the oil burner. Including one more spare plug-fused circuit to bring the total up to an even number, there will be required two 50-amp. fuses and 16 plug fuses.

A single panelboard complete with cabinet, having 16 plug-fused circuits and two 35-60-amp. fuses for the range circuit can be purchased for $21.85. The range fuses are mounted on a removable holder which can be used as a disconnecting switch.

The least expensive arrangement seems to be a combination of a so-called "range panel" having two 35-

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60-amp. fuses for the range circuit and six plug fuses, and a separate "residence type" 10-circuit panel. The cost of this combination is $14.40, to which should be added $8.00 for labor (8 hours at $1.00) making a total of $22.40.

Appliance Circuits

The following quantities, while for this particular house, are about the average for houses of this size:

Range circuit with flush receptacle and plug.	Price	Cost
26 ft. No. 6 3-conductor armored cable	$98.00	$ 2.55
1 4-11/16 in. square box		.21
1 Special box cover		.35
1 40-amp. 3-pole receptacle		3.92
1 40-amp. 3-pole plug		1.57
1 Steel plate		.60
Inspection fee		1.00
Labor—5 hours	1.00	5.00
Total		$15.20

Water Heater Circuit.		
23 ft. No. 12 2-conductor armored cable	$34.50	$ .80
2 Connectors		.06
1 30-amp. 2-pole 250-volt switch		1.65
Inspection Fee		.50
Labor—1.7 hrs.	1.00	1.70
Total		$ 4.71

Two Air Heater Circuits and installation of heaters (Heaters not included.)		
36 ft. 2-conductor cable	$34.50	$ 1.24
4 Connectors		.11
Inspection fee		1.00
Labor—4 hours	1.00	4.00
Total		$ 6.35

Oil Burner Circuit (Terminating on ceiling)		
25 ft. No. 12 2-conductor armored cable	$34.50	$ .86
1 Outlet box		.12
2 Connectors		.06
1 30-amp. 2-pole switch.		1.65
Inspection fee		.50
Labor—1.3 hours	1.00	1.30
Total		$ 4.49

Bell Work

Push buttons will be required at the front and rear doors, also a dining room floor push. As this installation is to be fully up to date, the recently developed flush devices are listed in the estimate.

Bell Work Costs	Price	Cost
1 No. 662 combination bell and buzzer		$ .81
1 No. 663 bell		.67
1 No. 666 transformer		.93
1 Floor push		.60
2 Outside pushes	$ .25	.50
1 3-gang outlet box		.25
140 ft. No. 18 R. C. fixture wire	3.00	.42
4 ft. No. 12 2-conductor armored cable.	34.50	.14
Labor—5 hours	1.00	5.00
Total		$9.32

Telephone Conduit

If the building owner wishes to eliminate all unsightly open wires on the outside of the house and stapled to the interior woodwork, a ½-in. conduit may be installed from a suitable point on the outside, leading to a box on the basement ceiling to contain the protector. From the protector box the conduit should be continued to outlets at the desired points, in this case one outlet in the library and one in the second floor hall. Flexible conduit may well be used for this purpose.

Telephone Circuit Costs	Price	Cost
90 ft. ½ in. flexible conduit.	$49.50	$ 4.46
1 ½ in. service head		.22
6 ½ in. connectors	6.80	.41
1 6 x 8 x 4 in. steel box		.75
2 Outlet boxes	9.00	.18
2 Outlet box covers	4.50	.09
2 Box hangers	10.50	.21
2 Telephone plates	11.00	.22
Labor—3 hours	1.00	3.00
Total		$ 9.54

Radio Wiring

A No. 14 wire should be run from some accessible point in the attic to a radio outlet in the living room and continued from the outlet to a water pipe in the basement as an inside antenna, or if the owner wishes to get extreme "distance" an outside antenna can be installed and connected to this wire. Two or more radio outlets may be desirable, but only one is figured here.

Radio Wiring Costs.	Price	Cost
50 ft. No. 14 wire	$ 5.00	$ .25
10 Knobs	11.00	.11
5 Tubes	3.50	.02
1 Outlet box and cover		.14
1 Box hanger		.11
1 Plate with 2 jacks		.44
1 Ground clamp		.05
Labor—1.5 hours	1.00	1.50
Total		$ 2.62

Total Cost

The estimated cost of the complete installation can now be found by adding together the totals of the preceding itemized estimates.

Totals.	
Branch circuit work	$200.64
70-ampere service (no meter test)	36.37
Feeder (flexible conduit)	12.21
Panelboard	22.40
Range circuit	15.20
Water heater circuit	4.71
2 Air heater circuits	6.35
Oil burner circuit	4.49
Bell work	9.32
Telephone conduit	9.54
Radio wiring	2.62
Total prime cost	$323.85
Markup—33⅓%	107.95
Selling price	$431.80

Under normal conditions the contractor's overhead on this class of work is seldom less than 25 per cent of prime cost and may be as high as 30 per cent. Any plan for the promotion of adequate wiring, if it is to be successful, must provide a profit for the contractor and the evidence indicates that a markup of 33⅓ per cent is about the lowest that can be expected to cover the contractor's overhead and leave a fair and reasonable profit.

Conclusions

The selling price of the actual installation in this house, based upon the same material and labor prices and the same percentage of markup, would have been $154.00. The price of the standard installation is $432, or $278 more. The increase is 180 per cent, or stated another way, the standard installation costs 2.8 times as much as a job representing about an average present-day layout.

The cost estimate for the standard installation amounts to $206.25 for material and 108.5 hours of labor. This compares with $58.76 for material and 50 hours of labor for the actual installation. The increased cost of material is $147.49, or 250 per cent increase, and the additional hours of labor are 58.5, an increase of 117 per cent.

The most important conclusion to be drawn from the figures here presented is that after giving the matter serious consideration over an extended period of time, a group of qualified men, chosen to represent the entire electrical industry, have laid down specifications for a wiring system which in a $14,000 house will cost approximately $432, or 3.1 per cent of the total construction cost of the house.

These figures are by no means extravagant, nor has there at any time been any thought of "loading the job", of making the installation unnecessarily elaborate so that we may get the largest possible share of the building dollar. On the contrary, every effort has been made to render a real service to the public and to keep the costs within reasonable limits. The final figures may be taken as representing the sincere and unbiased consensus of qualified experts as to what the public should invest in house wiring, not for the good of the electrical industry but for the good of the public.

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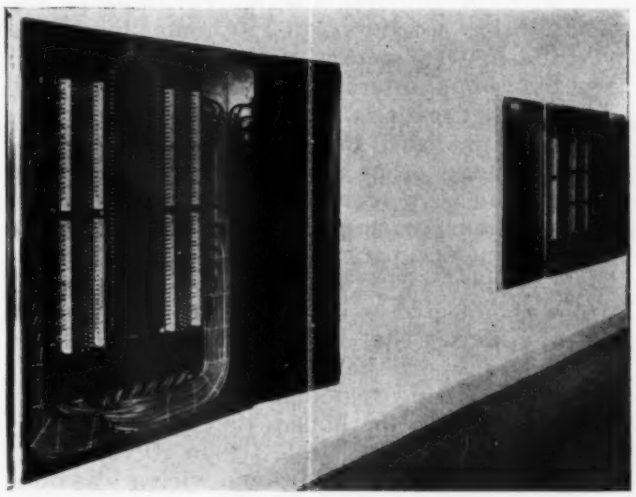
In the control equipment room the radio receivers, main amplifiers, power amplifiers, and distribution apparatus are arranged to be connected in jacks. This enables the units to be connected into various positions in the circuits by the use of cords similar to those used in telephone switchboards. The four people in this department are able to handle some very intricate situations through this flexibility, without using temporary wiring. Six radio receivers furnish as many channels of entertainment to the guest rooms.

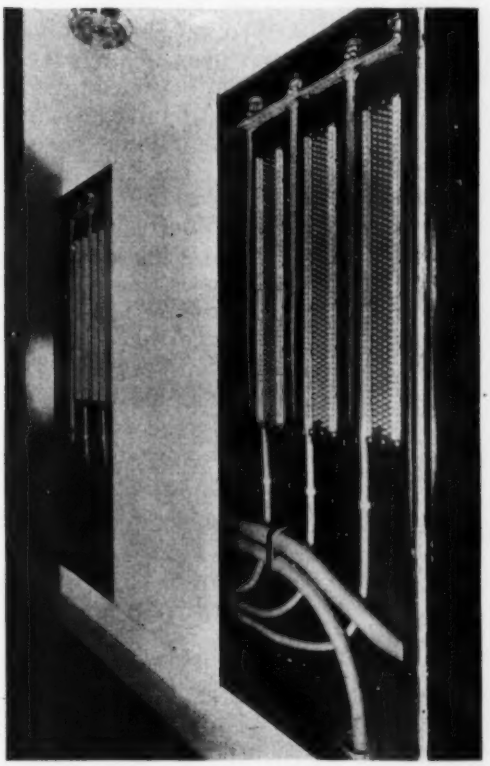
Best practice in

Program Distribution Wiring

Installation of Western Electric system in new Waldorf-Astoria Hotel in New York



The terminal racks for the microphones and loudspeakers for the public rooms were placed in terminal boxes in the wall. For the terminal rack for the microphone circuits (left) five conductor shielded cables were used and the shielding was grounded to prevent picking up electrical disturbances. The loudspeaker wiring (right) consists of a fourteen gauge twisted pair.



Distributing boxes from which the program circuits are taken to the guest room with a maximum of four groups connected to any one riser pair and a maximum of twenty rooms connected to any one group. Program circuits are carried up the three riser shafts in lead covered cables. There are two 152-pair cables in the first, one in the second and a similar 102-pair cable in the third. The sealing cabinets which provide connections between the cable and the terminal board are assembled in a room of known low humidity. In this instance a stub lead covered cable was connected in and the back of the cabinet filled with sealing compound, to exclude the moisture.

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electrical contracting

With which is incorporated The Electragist

S. B. WILLIAMS, Editor

FACTS WANTED

IN this issue are presented some reliable estimates showing what it would cost to wire a new house according to the Industry Adequacy Standards. An actual house was taken which cost to wire new in 1930 $154.00. Had the same house been wired according to the Standards the cost would have been $432.00.

The increase amounts to 180 percent. Is it worth it?

We raise the question because undoubtedly there will be some contractors and others in the industry who will say that the cost is too high—that you cannot sell the public wiring that costs so much.

We are inclined to agree that if house wiring is sold as it has been in the past, few installations will be made according to the Industry Standards of Adequacy. But are we going to continue to sell house wiring as we used to?

Adequate wiring can be sold. Of that there is no question. There are far too many instances of contractors who have sold adequate jobs in the face of low-price competition, and at higher prices. It is true that in virtually every instance the contractor was able to contact the individual who was building the house and was going to live in it.

Where speculative projects are concerned it has been proven in many cities, where the Red Seal Wiring Program has been energetically promoted, that adequate wiring can be sold.

Because house wiring has been sold at such low figures, our most difficult program is going to be with our own people—the members of the electrical industry. So long as they think that adequate wiring costs too much they will not be sold on the advantages of adequate wiring.

Although a Lincoln costs many times the Ford the salesman has no price complex to hamper him, because he is sold on the value of the higher priced car.

We all know what adequate wiring means to the electrical industry—bigger wiring jobs, more current consumption, more sales of wiring supplies and appliances—but what are its advantages to the public? That is what we must know before we can properly and enthusiastically sell adequate wiring.

One of the first things therefore that must be done is to bring together in one place all of the advantages to a house owner or prospective house owner or speculative builder of an adequate job of wiring and these advantages must not be just words, but facts and proof.

ELECTRICAL CONTRACTING would be glad to receive from its readers such facts and proof.

WHO DOES THE ADDITIONAL WIRING?

A RECENT survey by the Westinghouse Lamp Company of the wiring and lighting conditions in 566 homes located in the eastern section of the country brought out some interesting statistics. Some of the figures relating to wiring conditions were published in our March issue.

Among other things this survey showed that in 60 percent of the homes visited no additional wiring had been done since the present occupant moved in.

Where wiring had been done, however, it was not always done by an electrician. In the houses that the present occupants had lived in more than 10 years, over two-thirds of the wiring remodeling was done by electricians. In the houses that the present occupants had lived in less than 10 years only 30 percent of the additional wiring was done by electricians.

In the case of the older houses this probably means that the wiring remodeling amounted to the actual wiring of the house and that was done by an electrician.

In the newer houses, however, it appears from the survey that 70 percent of the additional wiring has been done by somebody without any electrical experience.

This, of course, represents in the aggregate but a very small volume of business. Nevertheless, for the most part it is business which contractors could have if a less expensive way of selling it was found. Moreover, it is the kind of business that is the opening wedge for larger sales.

BOOTLEG WIRING

ILLEGAL or bootleg wiring is wiring that is done without a permit and without inspection. It is immaterial who does it illegally. In some instances the illegal wiring is done by licensed contractors who try to save money by dodging permits and inspection fees.

In many places the inspection departments have either vanished or have been cut down so that they are no longer effective in policing wiring. This, of course, makes it easier for the bootleggers of wiring.

Worthwhile and reliable contractors are the ones to lose by bootlegging, but they will not get very far by talking and complaining. Action is needed. The New York City contractors are showing the way by employing a field man to get the facts on bootleg work, report them to the right people and get corrective action.

It is only in some such way that contractors can protect themselves. If they can find enough work to keep inspectors busy the city, as a rule, will provide the men. If they can make it hot for people who do wiring illegally, who peddle licenses, and otherwise disregard the law pertaining to wiring work, it will be found that fewer people will bootleg.

IT COSTS TOO MUCH TO SELL

"A MAJOR problem is the systematic promotion of wiring adequacy in the home—the extension of existing inadequate installations. Without it current cannot be utilized and equipment will not be bought. It is conceded that it will not bear the cost of direct selling. It must be sold by the man who goes there—the house wiring contractor and his men."

From the presidential address of J. S. Tritle to N.E.M.A., January 17, 1933.

There are two significant statements in this paragraph which we have lifted from Mr. Tritle's remarks, which those of us who have been promoting adequate wiring for years, have always recognized, but which the industry as a whole has pooh-poohed.

In the first place Mr. Tritle said extension of wiring in the home will not bear the cost of direct selling. We wish it were possible to sink this thought home firmly in the minds of every member of the electrical industry.

The lack of sales of additional wiring has been laid to the door of the house-wiring contractor and he has been called a poor salesman. Now we know it was not his fault at all. The cost to sell is too great.

Secondly, Mr. Tritle said this work must be sold by the house-wiring contractor and again we agree. In so doing, we are aware that somebody who has read the preceding paragraphs is going to accuse us of being contradictory.

The answer, of course, is the creation of a public demand so that the cost of direct selling will be reduced.

This was the conclusion reached six years ago by the Wiring Sales Conference. This was the program submitted to the Industry Sales Conference. This was the conclusion reached in the Thompson survey. This has been the recommendation of ELECTRICAL CONTRACTING for years.

The contractors will sell additional wiring in existing homes and in large volume just as soon as they can see a profit in the work. This means making sales at most houses so that the wiremen can be routed without much loss in time. To be able to do this the contractor must have prospects who do not have to be sold from the ground up.

There are, of course, other important factors to be considered such as financing, sales education for contractors and wiremen; but the most important is the creation of public demand. Until that is done the cost to sell will be too high.

The creation of public demand requires that the manufacturers and utilities cooperate in working out a national and local marketing plan and a campaign of sales promotion and advertising.

SALES SCHOOLS

UNDER the auspices of the Electrical League there was held last month in Cleveland a one-day merchandising conference that was attended by nearly three hundred local electrical men. These men came to the meeting to learn how and where to build business in 1933.

In Buffalo under the auspices of the local league a large and enthusiastic group of men attended, twice a week during March, a merchandising school of nine lectures.

These two activities are starters to show which way the wind is blowing. The contractors and dealers are hungry for sales help and guidance. They have free time and are eager to employ it by learning better selling methods and ideas.

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\\\ code chats ///

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES
ASSISTANT CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

GROUNDING OF BX EXTENSION TO K&T WIRING

If one branch circuit run in armored cable (over 25 ft. long) was added to an old knob and tube system that already had three branch circuits, what size wire should be used to ground the armored cable?

The branch circuit referred to in this question is a 15 amp. branch circuit having No. 14 wires protected by a 15 amp. fuse.

The size of the grounding conductor to be used in this case to ground the armor of the armored cable is governed by rule 907-n and by reference to this we find that a No. 14 wire will be sufficient.

BUSHING LEADED ARMORED CABLE

Is it necessary to use the red fibre bushing with lead covered armored cable? We have been using the bushings with regular armored cable but do not know whether or not the bushing is required with lead covered.

Rule 505-h is the one which contains the requirement for the use of the bushing on armored cable. This rule does not differentiate between ordinary armored cable and the leaded type. Therefore, the rule requires the bushing with both types. However, many inspection departments realize that where the lead covering of the wires extends beyond the armor it is practically impossible to insert a bushing and they therefore have ruled that where the lead is cut so that it does not reach the end of the armor a bushing must be used, but that where the lead protrudes beyond the armor so as to afford protection against the sharp edge of the cut armor, then a bushing is not required. This, of course, is a logical ruling as no doubt the lead will give as good protection as a bushing.

FUSE AT CHANGE IN SIZE OF WIRE

Is there any place in the Code that states a fuse must be inserted every time a change is made in the size of wire, unless a fuse protects the small wire?

Yes, this provision is found in Section 805 although it is worded somewhat differently than in previous Codes.

805-a requires that a protection device (fuse or circuit breaker) shall be provided and so placed as to protect each ungrounded wire. The second sentence of 805-a further strengthens this, requiring that the protective device be located at the point where the conductor receives its supply unless other sections of the Code permit it to be located elsewhere.

Therefore, if the size of a feeder is reduced, a protective device must be provided at that point because the device protecting the larger wire will not give proper protection to the smaller wire and it also has to be placed at this point, because it is at this point that the smaller wire receives its supply from the larger wire.

However, at the end of 805-a we find a reference to "other sections of this Code." This refers to 805-d which rule permits a slight deviation from strict compliance with the general provisions of 805-a providing the conditions stated in 805-d, 1, 2 and 3 are met.

WIRING IN DYE PLANTS

In my territory there is a strict local ruling pertaining to silk dye shops which demands open wiring where possible, such as the ceiling and across rafters where the work is not subject to mechanical injury, and painting conductors with at least two coats of acid proof paint.

I specialize in dye plant work and find it quite a problem to run open wiring. In these shops practically all motors are located within 5 ft. of the floor. In order to protect wiring from mechanical injury it is necessary to pipe the wires, and as 90 per cent of the installation is in pipe what objection should there be in making a complete galvanized pipe job?

A question arose whether this work could be installed entirely in conduit by using lead covered conductors, but this did not change the situation. Open wiring must be adhered to for the approval. Will you kindly give me an opinion in this case?

If the local inspection authority has deemed it necessary to establish special rules for dye plants it must be because the conditions have warranted it. Of course, work installed in that territory should be done in accordance with those rules. For any deviation from those rules the local authority should be consulted. No special rules have been set up in the Code for dye plants, it being left to the inspector to properly police the job.

It is quite well known that the iron used in rigid conduit, will not successfully withstand the effects of acids or corrosive fumes. If thoroughly painted with acid proof paint

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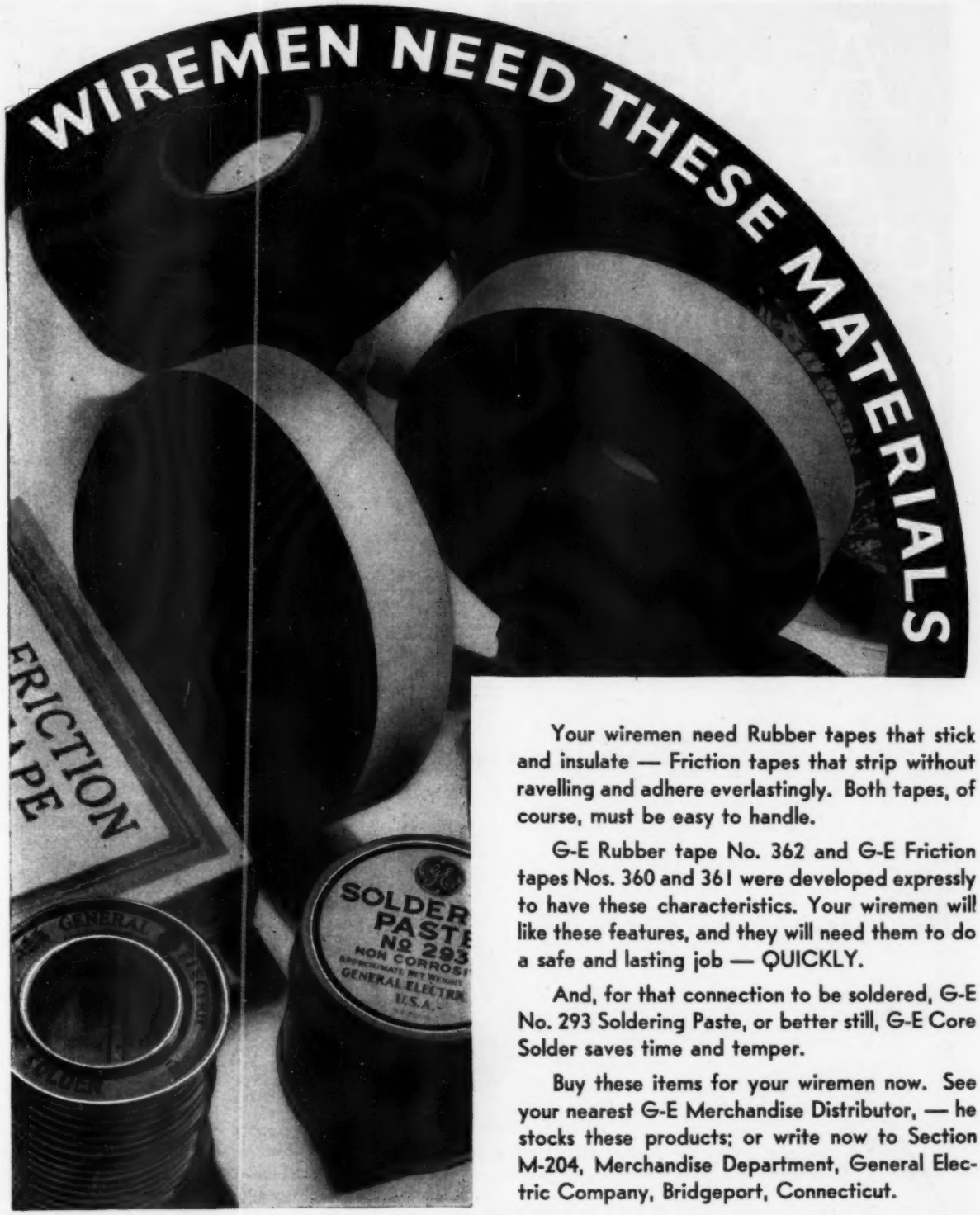

Your wiremen need Rubber tapes that stick and insulate — Friction tapes that strip without ravelling and adhere everlastingly. Both tapes, of course, must be easy to handle.

G-E Rubber tape No. 362 and G-E Friction tapes Nos. 360 and 361 were developed expressly to have these characteristics. Your wiremen will like these features, and they will need them to do a safe and lasting job — QUICKLY.

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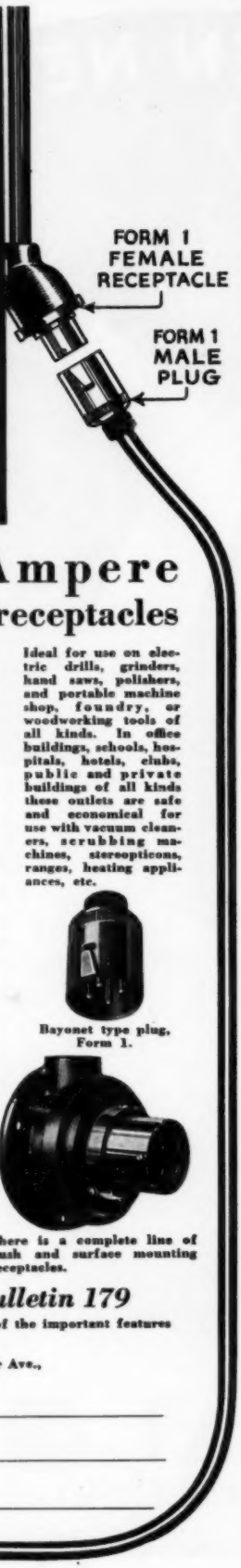

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circuit breaking plugs and receptacles

INDUSTRIAL plants, office buildings, institutions,—anywhere that portable tools, appliances, or heating units are used—all offer the opportunity for installation of these new heavy-duty outlets and cord equipment.

High voltage rating, heavy-duty design, greater safety, and economy in severe service are features that both management and maintenance men have long wanted. You meet this demand and you make an installation that you can stand back of without grief when you use this new line of Pyle-National plugs and receptacles.

These plugs and receptacles are approved for 20 amperes, 250 volts D.C., 460 volts A.C., yet are economical for use on any 110 volt portable equipment. Savings on cord and connector maintenance as compared with lighter fittings will pay for these high-quality plugs and receptacles over and over again. Bayonet lock and full enclosure of contacts prevent accidents. Operators cannot touch live contacts at any time.

Thirty-five years' experience meeting the severest railroad and industrial service conditions guarantees Pyle-National electrical equipment. Send the coupon below for Bulletin 179 and data on the places where you can make these installations now.

Ask your jobber about Pyle-National explosion-proof fittings, heavy-duty plugs and receptacles, and safety switches.

Ideal for use on electric drills, grinders, hand saws, polishers, and portable machine shop, foundry, or woodworking tools of all kinds. In office buildings, schools, hospitals, hotels, clubs, public and private buildings of all kinds these outlets are safe and economical for use with vacuum cleaners, scrubbing machines, stereopticons, ranges, heating appliances, etc.

Bayonet type plug, Form 1.

There is a complete line of flush and surface mounting receptacles.

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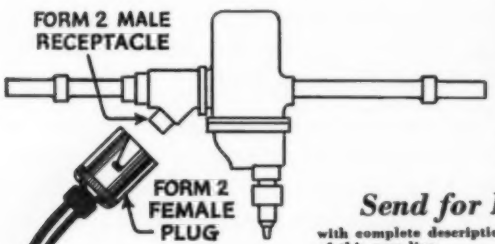

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it, in itself, would be protected against corrosion and would afford mechanical protection to wires within it, but as soon as the protective covering was scratched, or broken, corrosion would start, and this applies to the interior of the conduit as well as to the outside. Using lead covered wires inside of conduit in such places might seem to be a better job but with some acids, electrolytic action sets in and the lead might suffer a chemical change and its protectiveness be destroyed.

The rules on open work in Section 501 seem to indicate that this type of wiring may be better suited than others for use in such locations. In this connection note rules 501-d, e, f.

If 90 per cent of the job is in rigid conduit it would seem that putting the remaining 10 per cent also in conduit would not be so far amiss, but let the inspector be your guide.

GROUNDING THROUGH A RUN OF SMALLER CONDUIT

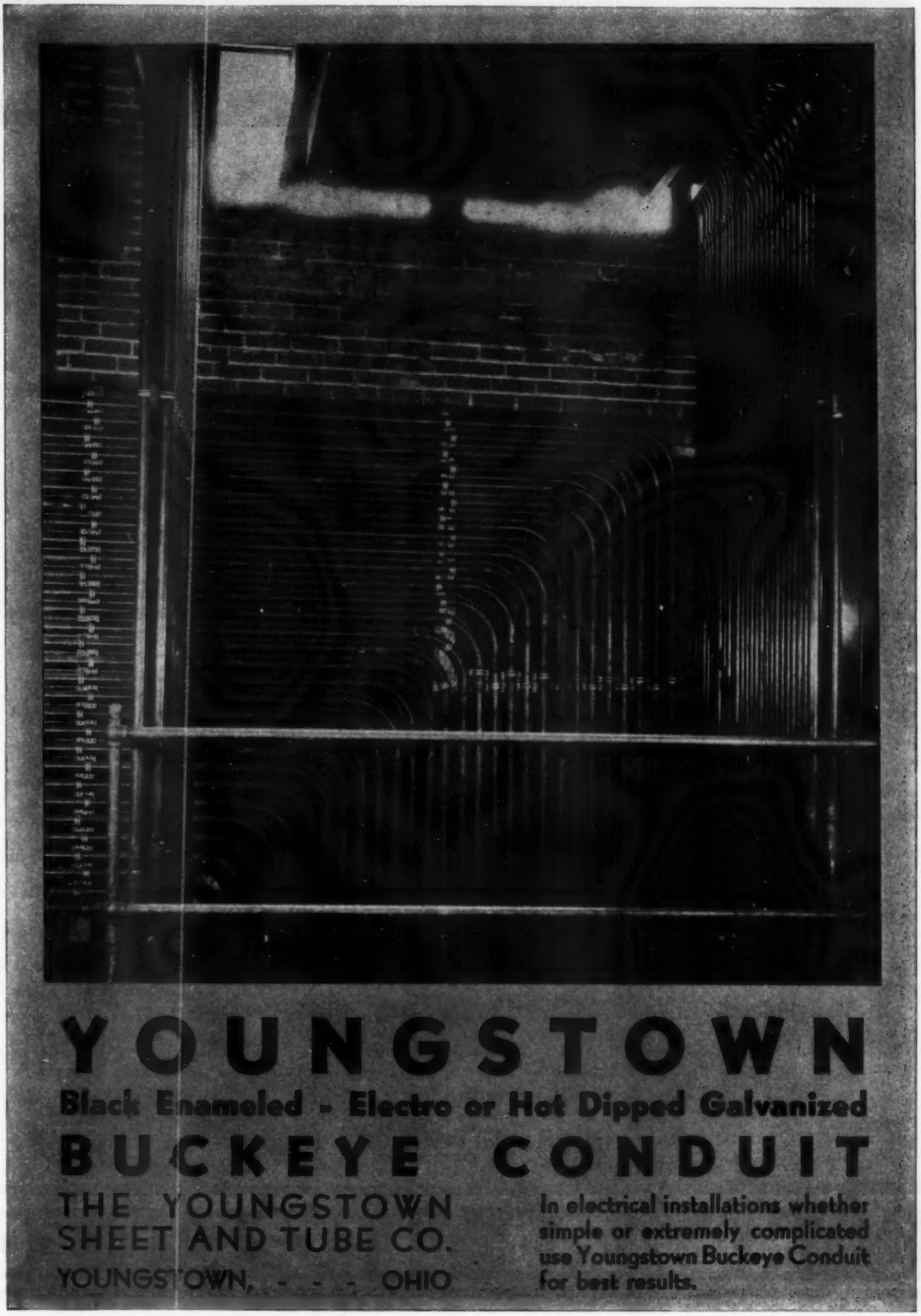
Please explain just what is meant in 904-b that the point of attachment shall be such that no run of conduit, cable, etc., is grounded through a run of smaller size.

This means that in general the grounding conductor used to ground the conduit or cable of an interior wiring system, shall be connected to the largest size conduit or cable used in the system.

Almost always the largest conduit or cable runs from the service or meters to the first distribution center, and smaller conduits or cables extend on from this point. It is this largest conduit or cable which is to be grounded to the water pipe by means of the grounding connection.

Now the above is in general the interpretation of 904-b but at the end of this rule is mentioned an exception. This exception says that the smaller conduit (not cable, however) may be used if it satisfies the requirement of 907-n. And please note that by the wording of 907-n this exception only applies in the case of rigid conduit and not with cable or flexible conduit. This exception means that if the smaller conduit is within the size mentioned in the table of Section 907-n (page 144) it is sufficiently large enough to ground to.

For example, we might have a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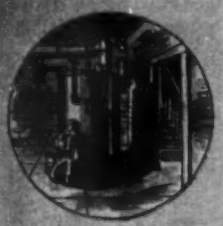

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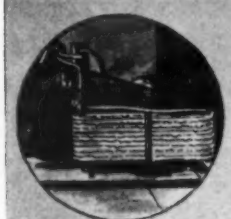

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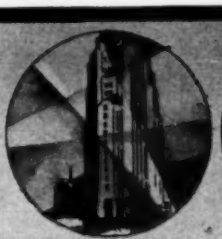

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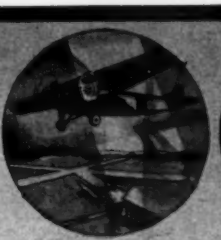

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You have 16 markets for the sale of time switches—read over the list—go after them all.

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VS—Synchronous
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VWD—Electrically Wound Duplex
TC—Electrically Wound Conduit Base
TM—Electrically Wound Meter Base
TCO—Electrically Wound Outdoor, Conduit Base
TMO—Electrically Wound Outdoor, Meter Base
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6. Airport lighting control
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10. Ventilation control
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12. Poultry house lighting control
13. Blower operation control
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15. Motor control
16. Oil filter control

These are the 16 markets where Sangamos are sold—where they are today efficiently operating—where they are saving money for the owners—where the contractors have made money through selling Sangamos.

If it is time-switches you need—if you have a time-switch problem you want solved—get in touch with Sangamo or any of the Sangamo jobbing houses in your city.

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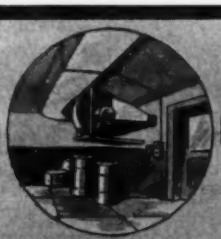
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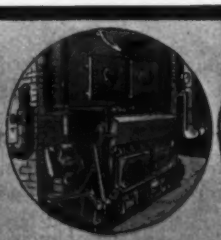
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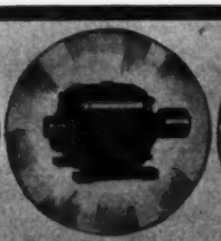
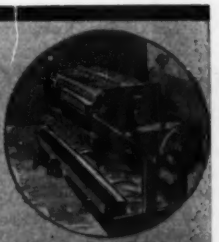

MOTOR CONTROL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THE greater the efficiency of the tools you use, the more chance you have for meeting competition and for making a profit on each job. That is where Greenlee Conduit Benders and Knockout Tools come in. They cut costs on every job where they are used.

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Greenlee Hydraulic Conduit Benders insure profits because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire. They are easy to take to the job, too, because they are portable.

Knockout Tools

Greenlee Knockout Punches and Cutters make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

Other Tools

Hydraulic Pipe Pushers
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State .....
My jobber is .....

4-33

feeder of three 200,000 C.M. cables in 2½-in. conduit with each wire protected by a 200 amp. fuse. According to 907-n a grounding pipe of ½-in. is sufficient. Therefore, if the 2½-in. conduit ran to a cabinet to which a ½-in. conduit was also connected, the grounding connection could be made to the ½-in. conduit provided this grounding connection is (904-b) "as near as practicable to the source of supply."

It is strongly recommended that the grounding connection be made in all cases in the largest pipe.

LOW VOLTAGE WIRING IN HAZARDOUS LOCATIONS

How would low voltage wiring, approximately 24-30 volts, be classified under Article 32? Would it be necessary to install this low voltage wiring in rigid conduit with explosion proof fittings, and also would the ordinary type of mercury tube thermostat be approved for such a location?

Low voltage wiring of the 24-40 volt type to be used in a hazardous location would have to be installed in accordance with both Article 32 and Article 40. These two articles will be found not to be in conflict, but the requirements of both should be complied with in a place of the nature indicated in the question. Wiring of this type would have to be enclosed in rigid conduit as required in Article 32 and if in Class 1 locations the conduit would have to have vapor-tight joints and fittings and provisions made for sealing off the conduit with an insulating compound.

Probably what is meant by the "mercury tube thermostat" is a thermostatically-operated hermetically sealed glass tube enclosing contacts and a small quantity of mercury, similar to the "Mercoid" switch. While with this type of switch the arc from opening the circuit takes place within the sealed glass tube and therefore does not seemingly present a fire hazard yet this switch is not listed as approved in hazardous locations and, of course, should not be so used until it has been approved for this use.

Maybe if the manufacturer of some of these switches would submit their product for approval in hazardous locations they might get them approved for this use.

NOW- how to repair and rewind all types of motors...

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THIS set of books should be on the shelf of every man who ever has to touch a motor for purposes of repairing it or changing it to meet different operating conditions. In shop language and with practical shop methods it covers every step in stripping, rewinding and connecting a.c. and d.c. motors of all kinds.

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How to change motors for different operating conditions

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Do you ever need information on:

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—how to make voltage in induction motors
—how to make alternating-current windings for different frequencies
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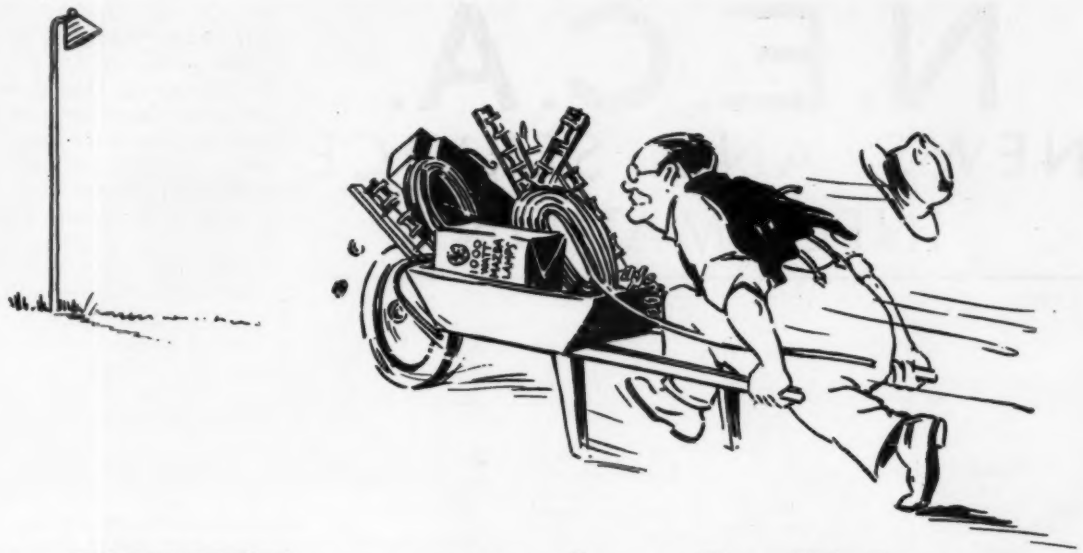

You PROFIT on more than floodlights when you sell a floodlighting job

EVERY floodlighting installation requires collateral material, such as lamps, wire, cable, switches, and poles, and a certain amount of direct labor. It is not the floodlights alone that bring in the profits.

Take, for example, a single playground tennis court installation. The minimum tennis court lighting layout recommended by General Electric illuminating engineers calls for four G-E open-type floodlights. With these, however, go the following collateral materials:

8	1000-watt MAZDA lamps
1000 ft.	No. 4, N. E. Code, 600-volt Wire
1	Weatherproof Fusible Safety Switch and Fuses
90 ft.	1¼-inch G-E Conduit
	Conduit Locknuts and Bushings
	Pipe Straps and Entrance Caps
7	3-wire G-E Secondary Racks
4	35-foot Wood or Steel Poles

In some cases, the value of the collateral materials and the costs of installation far exceed those of the floodlights themselves. When you estimate the value of floodlighting to your business, consider also the value of collateral materials.

For further information regarding floodlighting installations, standard layouts, or recommendations for unusual applications, write to the nearest G-E office or General Electric Supply Corp. office, or to General Electric, Schenectady, N. Y.

710-173

GENERAL ELECTRIC

N.E.C.A.
NEWS AND SERVICE INFORMATION

MATERIAL FOR THIS DEPARTMENT IS SUPPLIED BY THE HEADQUARTERS STAFF OF THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION
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Vice President, Earl N. Peak
1603 West Main Street, Marshalltown, Iowa

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Contractors Organized for Industry Welfare

SEPARATION BILL IN CONGRESS

Representative Carley reintroduced in the House of Representatives on March 9, 1933, a bill to provide for the separation of bids and awarding of contracts on the electrical equipment, plumbing and gas fitting, steam and hot-water heating, ventilating apparatus, etc., where such work exceeds the sum of $1,000, in the erection, alteration or repair of any building, in any state or territory or in the District of Columbia, by the United States.

This bill for the separation of contracts, for the mechanical work on all government building, is now known as H.R. 113, and was referred to the Committee on Public Buildings and Grounds. A similar bill will be introduced in the Senate by Senator Barbour.

A joint legislative committee on separation of contracts is being set up by the N.E.C.A., together with the National Association of Master Plumbers, and the Heating and Piping Contractors National Association, to work for the passage of this bill, H.R. 113, in the present Congress.

DENNIS JOINS N.E.C.A. STAFF

The Association announces the addition to its staff of Stanley A. Dennis, as field representative, to cooperate with the membership throughout the country in building up membership and strengthening the organization's influence.

Mr. Dennis is unusually well fitted to represent the Association through his long familiarity with the industry, his sympathy and understanding of the electrical contractors' problems, and the acquaintanceship and high respect which the industry has for him through his many years of industry relationships. He was connected with the electrical trade press during the past 15 years in the following capacities: Associate Editor, *Electrical Merchandising,* 1918-1922; Editor, *Electrical Retailing,* 1922-1924; Editor, *Electrical Record,* 1924-1931; Editor, *Electrical Manufacturing,* 1928-1929; Editorial Director, *Gage Publications,* 1929-1931; Vice President & Treasurer, Gage Publishing Company, 1931.

From 1924 to 1931 Mr. Dennis was a member of the Board of Governors of the Electrical Board of Trade and the Electrical Association of New York City.

Mr. Dennis has been active for 14 years in association work of the contractor-dealers and the leagues of this country. In 1919 and 1920 he was a member of several committees of the National Association of Electrical Contractors and Dealers, and in particular was active with the Cost Accounting Committee in the development of the Standard Accounting System, which has been adopted and is used by hundreds of members of the Association.

Mr. Dennis will be located for the present in the middlewest, working first in Illinois and the surrounding territory. Until further notice, communications addressed to Stanley A. Dennis, Field Representative, N.E.C.A., may be sent % President L. E. Mayer, 14 North Franklin Street, Chicago, Ill.

MOTOR MERCHANDISING CONFERENCE

The joint committees on motor merchandising of National Electrical Contractors Association and National Electrical Manufacturers Association met on March 16 at New York. The manufacturers' group was represented by O. F. Stroman, Westinghouse Electric & Mfg. Co., as chairman, C. F. Pittman, General Electric Company, and C. L. Collins, Reliance Electric & Engineering Company. L. W. Grothaus, Allis-Chalmers Mfg. Co., and R. J. Russell, Century Electric Corp.

The NECA Committee consisted of J. Roland Stolzenbach, Baltimore, chairman of the NECA National Motor Section, Louis Kalischer, Brooklyn, H. B. Frazer, Philadelphia, and General Manager Davis.

The original seven-point program of the National Motor Section was reaffirmed by the NECA Committee, with particular emphasis upon definite policies as to franchised motor specialist agents, classification of sales, and the restriction of machinery manufacturers to the sale of motors, controls, etc., only when installed on their own apparatus.

Discussion was directed to point No. 7 of the Motor Section program, in which compensation is claimed by the motor specialist where apparatus is sold direct and the responsibility for correct connection and starting up must be assumed by the motor spe-

UMI

SEATTLE ART MUSEUM, SEATTLE, WASH.
Architects: Bebb & Gould, Seattle; Consulting Engineer: Lincoln Bouillon, Seattle; Electrical Contractors: NePage McKenny Co., Seattle. Approximately 7000 feet of Steeltubes installed.

ANOTHER CONVERT *to* STEELTUBES

AFTER completing the electrical installation in the new Seattle Art Museum, NePage McKenny Co., well known Pacific Coast Engineers and Contractors wrote: "We used Steeltubes and found that it worked very satisfactorily."

Contractors everywhere are having the same experience on every type of work. They are finding that Steeltubes affords the same degree of mechanical and electrical protection as the old-style threaded rigid conduit—that bending and cutting are easier—that no threading is required—that fewer tools are needed—that only three simple fittings adapt it to any job—that a material saving in installation costs is reflected in the profit figures.

Steeltubes is recognized as the modern threadless rigid conduit. Sales records prove its wide acceptance—more than 30,000,000 feet installed since its advantages were first made known to the electrical trade. It has been given broad code and Government approval.

The sooner you try Steeltubes the sooner you, too, will become a convert to the continued use of this most economical form of circuit protection. Stocked by electrical supply houses in all distribution centers.

Complete information sent upon request.

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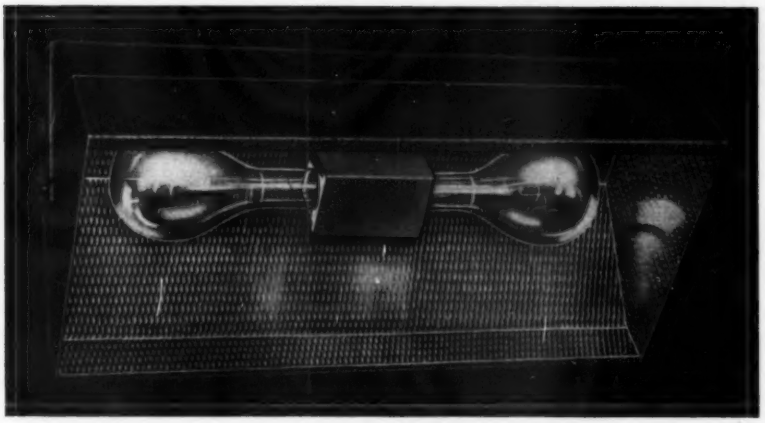
Steeltubes

Electrical Division
STEEL AND TUBES, INCORPORATED
World's Largest Producer of Electrically Welded Tubing
CLEVELAND » » OHIO
A UNIT OF REPUBLIC STEEL CORPORATION



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Wadsworth Adjustable Units for Show Windows and various classes of lighting.

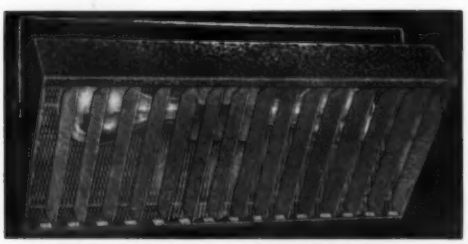
A product outstanding from a standpoint of light efficiency and economy and greater flexibility.

There are many prospects in your locality that want and will buy a product that will produce—

BETTER AND MORE ECONOMICAL LIGHTING.

Grasp this opportunity now by calling on them. Your efforts will bring about—

MORE PROFITABLE WIRING JOBS.



Lighting Unit with Louvers installed

See your Jobber or write us for Catalog R24, which completely describes this new product and lists the many applications possible with Wadsworth.

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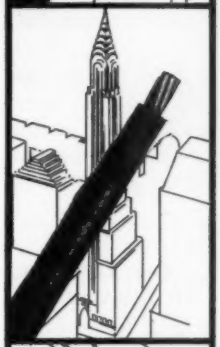
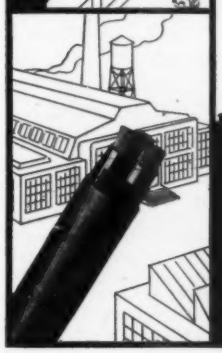
cialist. The manufacturers' claim in the past has been that compensation for such work should be included by the motor specialist in his original estimate for the wiring. It was pointed out that this same condition applies to the machinery manufacturer, who claims and is allowed special compensation for adapting motors of various manufacturers to their machines, which, under the manufacturers' reasoning should be provided for in the sale of the apparatus. If compensation is provided for the machinery manufacturer, why not the motor specialist?

The NECA representatives also pointed out that the machinery manufacturer performs only a limited service in his sales of motors and holds no loyalty toward any particular manufacturer, standing ready to attach any motor that the customer desires with their machinery equipment. Therefore, to allow the machinery manufacturer a longer discount than is granted to the franchised motor specialist, who is performing a promotional sales service for the motor manufacturer whose franchise he holds, is unfair, and leads to abuses of this advantage by the machinery manufacturer in the sale of motors not attached to his apparatus against the franchised motor specialist.

Particular attention was directed in the conference to the character of service which the motor specialist performs today in the sale of larger motors. In most cases the motor specialist today is as competent as, and often more competent than, any other representative of the motor manufacturer, and his contact with the customer field makes it increasingly important that the motor specialist be recognized as the logical outlet for the larger motors and with proper protection and differentials. Except in cases of unusual engine or compressor conditions, most large motor applications can be made to the advantage of the user and the manufacturer by the motor specialist, and a few exceptional large motor applications should not be used to establish a principle that a preferential not available to the motor specialist be allowed to engine and compressor manufacturers on all applications.

At the close of the conference the manufacturers' representatives stated that they felt it had been one of the most constructive yet held.





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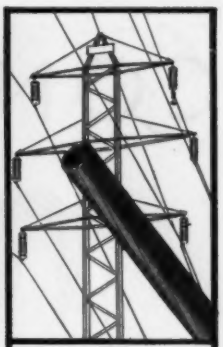
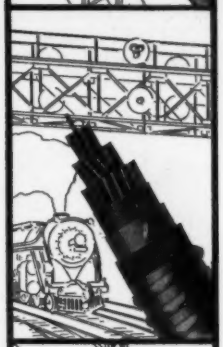
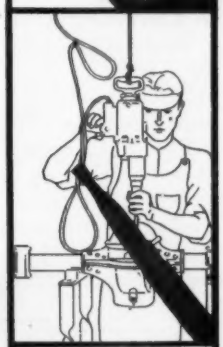
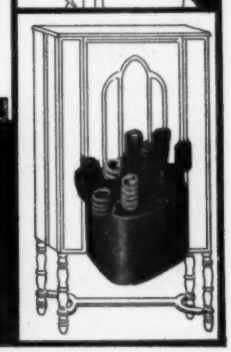
ARMORED SERVICE ENTRANCE CABLE

Cuts installation costs and should broaden your sale of load building appliances . . . . .

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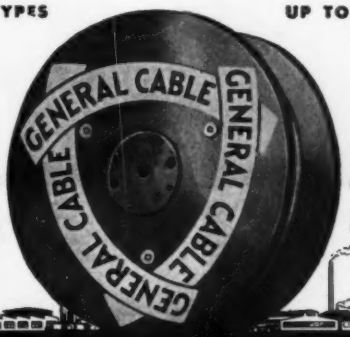
ALL SIZES AND TYPES UP TO 220,000 VOLTS



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CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO THIS DEPARTMENT

N. Y. CONTRACTORS FIGHT BOOTLEG WIRING

In order to better organize the electrical business and particularly to stamp out bootleg wiring, representatives of more than twenty contractors' associations throughout New York City met on March 18 to discuss plans for the formation of a permanent organization to handle these problems.

Among the problems to be worked on immediately are:

A state licensing ordinance.

Prevention of wiring by hardware stores and handy men who do not carry a license.

Farming out of licenses by licensed men to unlicensed people.

Requiring contractors to be organized according to law.

Requiring contractors to file on all work with the city inspection department and advocating underwriters' inspections as well on all work.

The new organization has employed a field man to investigate and secure action on all complaints regarding bootleg wiring and other infractions of the license laws and inspection requirements.

NEW MODERNIZATION WAGE SCALE FOR CHICAGO

An amendment to the present Chicago wage agreement which terminates May 31, 1934, went into effect on March 9 whereby the scale for journeymen wiremen is reduced for modernization work to $1.06¼ per hour.

This new scale is for the purpose of stimulating modernization work and applies to all installations, alterations and additions in existing residential buildings and to alterations and additions for owners of stores, offices, hotels, churches, public schools, private hospitals and operating manufacturing and industrial plants, requiring the employment of not more than three other basic building trades. It does not cover so-called extra work.

The contractors, using men at this rate, agree to employ one or more salesmen who will devote their time to the solicitation of this class of work and to the employment, 90 days after the signing of the agreement, of two union wiremen continuously on this class of work.

A plan has been devised whereby the employers are to keep a daily record of work solicited and contracts received for this class of work.

NEW CHIEF OF BOSTON INSPECTORS: Peter F. Dolan, who for the past twelve years was acting superintendent of the Wire Division of the Boston (Mass.) Fire Department has been appointed superintendent, succeeding Walter J. Burke, who resigned his position as superintendent, after serving 42 years, due to illness. Mr. Dolan was born in East Boston, Mass., and graduated from the Massachusetts Institute of Technology in 1893. He joined the Wire Department in 1894 as electrical engineer. From 1908 to 1911 he was in the electrical contracting business, and in 1911 he was appointed chief inspector of the Wire Department (exterior division), acting as superintendent in the absence of Mr. Burke.

NON-TAMPERABLE FUSE TEST PROCEDURE

Underwriters Laboratories announce that in view of the adoption by the Electrical Committee, N.F.P.A., of rules for the next issue of the National Electrical Code governing non-tamperable plug fuses it has set up a procedure for handling the matter.

The laboratories will accept submittals of dimension models or commercial samples of adapters, fuses and cutout bases, but no conclusions for any design will be attempted until after May 15, 1933. After that date studies will be made to determine the dimensional and design limits necessary to standardization and interchangeability and a report made.

COLORADO LEAGUE PLANS REINSPECTION PROGRAM

The Electrical League of Colorado has outlined its activities for 1933, and among the various things, the members plan to make an earnest effort toward promoting reinspection of existing wiring installations during this year.

WISCONSIN WORKING FOR ANTI-MERCHANDISING ACT

A bill to prohibit utilities from merchandising in Wisconsin is being supported by the Wisconsin Association of Electrical Contractor-Dealers, the Milwaukee Association of Electragists, as well as various other associations throughout the state. A portion of the bill reads as follows:

No utility as herein defined shall do any work of any kind on customers' premises except the furnishing of the service connections, nor shall any such utility service any installations or appliances, but it shall have the right to make minor adjustments to appliances. For the purpose of this section, electric light bulbs shall be deemed merchandise.

Any public utility shall have the right

A NEW Exide PRODUCT CAN BE SOLD NOW IN YOUR MARKET

A NECESSITY

NO OTHER PRODUCT LIKE IT

Keepalite HAS NO COMPETITION

KEEPALITE EMERGENCY LIGHTING

is the BIG 2-WAY Profit Maker You've Been Waiting For

USER'S PRICE
$165
Liberal Sales Profit Plus Installation Profit

Send the coupon below and get the Contractor's Folder which gives complete details of Keepalite. Then decide whether or not you can afford to pass up this profit making opportunity.

WHY A NECESSITY: Storms and street accidents bring down power lines, throwing whole communities into complete darkness, despite every effort of Utility Companies to prevent service interruptions. In crowded school auditoriums, hospital operating rooms, theatres, etc., lighting interruptions can easily result in injury, serious damage and loss of good-will. Obviously, that is why KEEPALITE Emergency protection can be easily sold to protect such buildings.

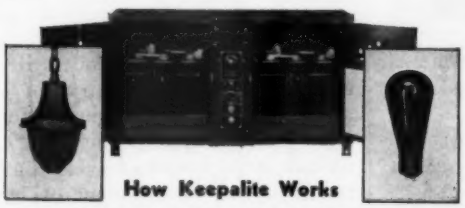
The Market for KEEPALITE at its unusually low price is almost without limit! This is demonstrated by the fact that thousands of larger Exide Emergency Lighting Battery Systems—costing 5 to 25 times as much as KEEPALITE—have already been sold.

KEEPALITE fills a definite need in every community. Emergency Lighting protection is needed regardless of the times. *KEEPALITE can be sold now! Have you ever before had a product to sell which offered a greater opportunity to render a vital service and at the same time make substantial profits?*

Keepalite
REG. U.S. PAT. OFF.
Emergency Lighting System
"THE EXIDE WATCHMAN"

Good Keepalite Prospects

Hospitals	Swimming Pools
Schools	Restaurants
Theatres	Apartments
Banks	Hotels
Engine Rooms	Institutions
Stores & Markets	Jails, etc., etc.



How Keepalite Works

Whenever the normal supply of power is interrupted, Keepalite, "The Exide Watchman", *automatically* and *instantaneously* furnishes enough light to adequately protect 10 thousand square feet of floor space. It gives split second action—without a hand touching a switch. When normal power is restored the Keepalite System *automatically* shuts off; and the battery goes back on trickle charge.

FREE

Booklet fully describing Keepalite: Why Keeplite; What It Is; Where Needed and HOW TO SELL IT. *Clip, sign and mail this coupon today.* It leads the way to bigger 1933 profits.

MAIL THIS COUPON TODAY

THE ELECTRIC STORAGE BATTERY CO.,
19th & Allegheny Avenue,
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Please send me your FREE Contractor's Booklet describing Keepalite—the NEW 2-Way profit maker.

Name.....

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The World's Largest Manufacturers of Storage Batteries for Every Purpose

MURRAY
SAFETY SWITCHES

SKY HIGH QUALITY

IRVING TRUST COMPANY, Broadway & Wall Street, New York; Voorhees, Gmelin & Walker, Architects; Meyer Strong & Jones, Engineers; J. Livingston & Company, Electrical Installation

Murray Metering Equipment Consisting of Meter Pans—Test Blocks—Transformer Cabinets—Troughs and Special Cabinets installed throughout

METROPOLITAN
DEVICE CORPORATION
1250 ATLANTIC AVENUE
BROOKLYN · NEW YORK

to sell the by-products which are necessarily and naturally derived from its production of gas, heat, light, power or water which it furnishes to regular customers. Nothing in this section shall prohibit a utility from conducting displays of appliances which may be used in connection with the gas, electric, water or heat service it sells, and it shall have the right to demonstrate the use of such appliances in the furtherance of its sale of such gas, electricity, water or heat. Meters, transformers and switches which remain the property of the utility shall not be deemed to be appliances within the meaning of this section. Any utility shall also have the right to make such emergency repairs as are necessary to insure continuity of its service to its customers.

LOWER WAGE RATES FOR ST. LOUIS

In an effort to stimulate work an amendment to the existing agreement between the local union and the St. Louis electrical contractors went into effect on March 23 whereby wages were reduced from $1.67½ an hour to $1.00 an hour for specified work and 75 cents an hour for other work. The contractors who signed the amendment agree to provide, 90 days after signing, 40 man-hours of work per week under the plan. This work may be pro-rated by the union among its membership.

The amendment also changes the working hours from a 6-hour day, 5-day week, to an 8-hour day and 6-day week.

CONTRACTORS HEAR OPPORTUNITIES IN RADIO AND SOUND

On March 8, the contractors' group of Electrical Association of New York, were given a demonstration of the business opportunities in the radio and sound field by the Commercial Radio-Sound Corp. of New York City, distributors of RCA Victor centralized radio, public address, antenaplex systems, and sound moving picture apparatus.

George E. Cole, manager of centralized radio sales of RCA Victor Company, outlined the policy of his company in the distribution of the above products and moving pictures were shown, demonstrating what can be done with portable moving picture outfits in the development of business.

Alexander Fisher, president of Commercial Radio-Sound Corp., who has been in the contracting business for a number of years, outlined the contractors' opportunities, and dem-

G-E WHITE
RIGID CONDUIT
made by GENERAL ELECTRIC

EASY BENDING
GLYPTAL COATED
(inside and out)
HOT-DIPPED GALVANIZED
(inside and out)
CLEAN CUT THREADS

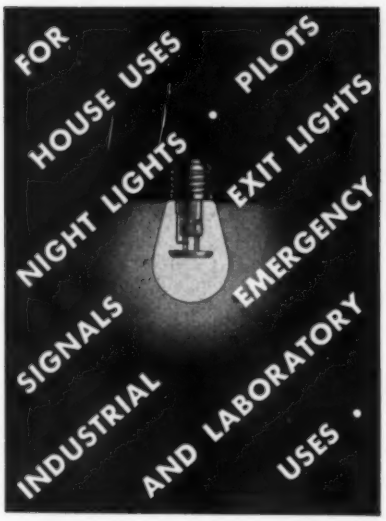
For further information see your nearest G-E Merchandise Distributor or write to Section C-204, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

GENERAL ELECTRIC
RIGID CONDUIT

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC CO., BRIDGEPORT, CONN.

At new, reduced prices

NEON GLOW LAMPS



reach wider range of uses, sales and profits

Increased demand brought increased production. That brought lowered manufacturing costs. And now, for *you*, a new, drastically reduced price on Neon Glow Lamps! The Neon Glow Lamp keeps reaching out into a wider field of uses. Consumes in continuous use less than a few cents' worth of current a month. Ideal for night and emergency home lights. For pilots and signals. For intermittent lighting free from lag. For theatre and other exits. For stroboscopes, oscillators, etc. Write for complete information on uses, types, prices. General Electric Vapor Lamp Co., 867 Adams Street, Hoboken, N. J.

GENERAL ELECTRIC VAPOR LAMP COMPANY

554 Copr. 1933, General Electric Vapor Lamp Co.

PORTABLES *that meet every requirement*

The eight portable lamp guards pictured here present only a portion of the extensive McGill portable guard line.

McGill Portables designed to meet every imaginable need, bring directed and protected light to **every job** and **every worker.**

McGill Portables perform a multiple duty; they guard light bulbs against breakage, and guard workers from the danger of serious injury. They protect workers from strain due to improper lighting conditions, and protect your invested dollars against unnecessary losses... Write for our interesting catalog describing the entire McGill line of portable lamp guards.

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA
Box No. 670

onstrated the type of equipment which the contractors in the New York territory are developing in their sales efforts.

This marks a new departure in the sale of radio and sound apparatus where the contractor is not alone given the opportunity of selling the equipment and wiring for same, but is backed by the resources and engineering staffs of both the manufacturer and distributor.

HENRY A. SINCLAIR

Henry A. Sinclair, a pioneer in the electrical industry, died February 13 at his home in Mystic, Conn., at the age of 77.

Mr. Sinclair joined the Tucker Electric Construction Company in 1887, serving as secretary and treasurer. After forty years of service, he retired from the company in 1926, bringing to a close one of the closest and longest associations in the electrical contracting industry. During almost his entire business life he was associated with James R. Strong, past president, N.E.C.A.

DENTON WITH RIGID CONDUIT INDUSTRY

The rigid conduit industry announces that A. Penn Denton has been retained as consulting engineer to the industry and its technical committee to have charge of all technical work relating to codes and standards as well as guide a program of research and standardization now being undertaken.

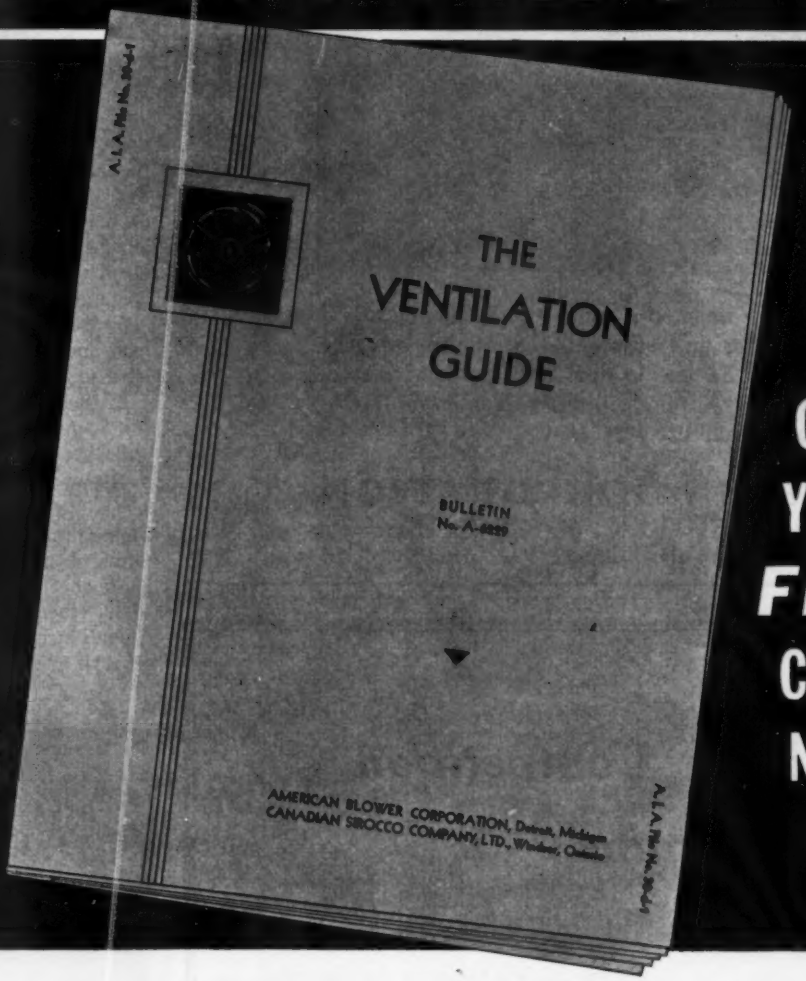
Mr. Denton was engaged in business at Kansas City, Mo., for twenty-one years as an electrical engineer and contractor, during the greater part of which time he was a member of the Executive Committee of the National Electrical Contractors Association and in that capacity represented the electrical contractors on the Electrical Committee, N.F.P.A.

During ten years of service on the Electrical Committee, he served on five of the article committees, and was best known as the chairman of Article 5 Committee.

In 1926 he received honorable mention under the James H. McGraw award to contractors for originating and developing the plan by which local electrical codes and standards committees were organized throughout this country.

Extra!

A NEW GUIDE TO PROFITS



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START CASHING IN ON ELECTRIC VENTILATION

SEND for your copy of the new American Blower Ventilation Guide today.

It is a complete, up to the minute technical data book and reference guide for the solution of practically every ventilation problem — arranged in convenient form — simple and easy to understand and follow.

Contains helpful sales information, installation methods and data, charts for figuring duct work, air change information. Shows how to select proper equipment, how to figure air changes and gives a wealth of facts and figures in chart and diagram form, with numerous illustrations of equipment and installations.

Help yourself to better business and greater profits in selling electric ventilation this year. Mail the coupon for your copy of the Ventilation Guide.

AMERICAN BLOWER CORPORATION, DETROIT, MICHIGAN
CANADIAN SIROCCO CO., LIMITED, WINDSOR, ONTARIO
BRANCH OFFICES IN ALL PRINCIPAL CITIES

American Blower

VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT

AMERICAN BLOWER CORPORATION, 6000 Russell St., Detroit, Mich.
Send a copy of your Ventilation Guide to:

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*Firm Name*_____ *Street and Number*_____

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UMI

WHAT YOU CAN EXPECT FROM LIGHT

Frink lighting for New York Central R. R., Chicago, Ill. Fellheimer & Wagner, Architects.

Modern lighting must do more than illuminate. It must be distinctive and efficient—harmonize with the room design and be low in cost and in maintenance. All of these you will find in Frink illumination. No obligation to consult us.

THE FRINK CORPORATION
STERLING BRONZE CO., INC., 23-10 Bridge Plaza South
Long Island City, N. Y.

Beating Competition with Brains

Competition is tough in the electrical contracting business these days; and every day it gets worse. Successful contractors have found they can beat fly-by-night competition best by using their brains, and by educating their responsible employes. You can help your head men to keep abreast of the times and save you money by sending each his own copy of ELECTRICAL CONTRACTING.

PRACTICAL METHODS

SIMPLE METHOD FOR KEEPING LABOR COSTS

Joe Root of the Western Montana Electric Co., Missoula, Mont., has kept the billings on every job he has done since 1912, to which are added the labor costs on each job. He finds this of inestimable value on new jobs as they come up from time to time which are somewhat out of the ordinary, as, for instance, such things as hospital call systems. In making an estimate on such work, where the man-hours that will be involved is hard to determine in advance, it is a great help to be able to turn back to some similar job in the past and find out what was required in that case.

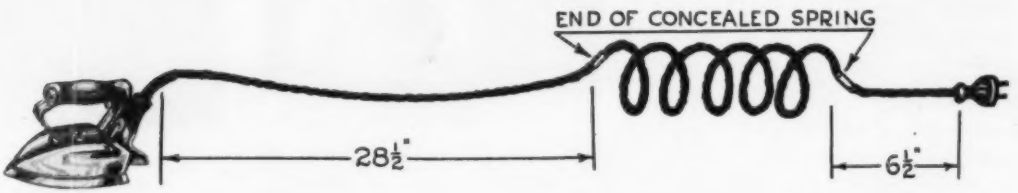
His method of keeping these data in accessible form is simplicity itself. He has had made by the printer a form of billing book, bound, which contains white sheets for the original bills and under them yellow sheets for the copy. The copies stay in the book and on each one the labor required on the

CIRCULAR BAKE OVEN: The Electric Power & Construction Co., Akron, Ohio, uses a round bake oven which keeps heat at an even temperature throughout the oven. The electric fan further eliminates the possibility of dead air pockets found in ovens having corners. "Perfect drying," says Mr. Heffelman, proprietor, "comes only through the circulation of air—heat alone is not enough." The fan motor is outside the oven and connected by a shaft to the fan blades. As the oven is ordinarily dark a guard is placed between the fan blades and the door as a protection for the worker. The doors open from both sides and top to facilitate in cooling after baking.

KEEP YOUR IRONS AND OTHER APPLIANCES *SOLD!*

WITH HEMCO *EVERCLEAR* CORD SETS

LISTED AS STANDARD BY UNDERWRITERS' LABORATORIES



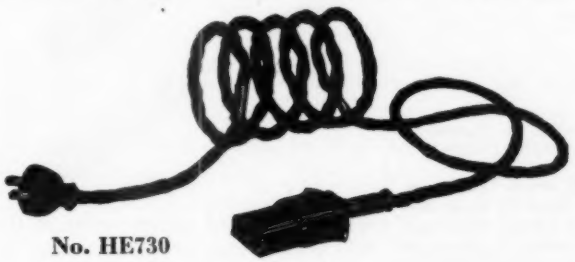
HERE IS THE LATEST IMPROVEMENT IN NON-KINKING CORD SETS

By having the self-coiling spring extend only to within 6½ inches of the attachment plug cap and 28½ inches of the appliance plug, the tension on the cord and the cap is greatly reduced. A 7'6" cord will extend 3'6" with absolutely no tension. Yet the cord set is kept free of kinks and out of the way at all times.

To use these cords requires less effort. Any tendency for the cap to be pulled out of the receptacle is practically eliminated. The slack portion of the cord permits it to be detached without the plug or cap being catapulted through the air.

The self-coiling spring, concealed beneath the outside fabric covering, is made of triple laid piano wire securely fastened to the cord by stout metal sleeves. Severe tests of these cord sets demonstrates the long life of the spring and method of fastening. Age alone has no effect.

Made of No. 16 Conductor, 3000 cycle Heated Cord. **Equipped with brown HRY Rubber Handle Cap.**



No. HE730

No. HE730
Length: 7'-6"
Equipped with H280
1000 Watt
Switch Appliance Plug

No. HE733
Length 7'-6"
Equipped with H738
Switchless Appliance Plug

BRYANT SUPERIOR WIRING DEVICES

EC433

Manufactured by THE BRYANT ELECTRIC CO., BRIDGEPORT, CONN.

MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888-MANUFACTURERS OF HEMCO PRODUCTS

BOSTON 140 Federal Street · · · CHICAGO 844 West Adams Street · · · NEW YORK 60 East 42nd Street · · · SAN FRANCISCO 149 New Montgomery Street

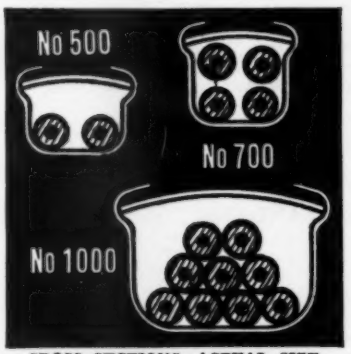
UMI

The KEY—to Them ALL!

Wiremold makes wiring jobs easier to sell—and handle at a profit

Easier to sell—because the contractor, who knows his Wiremold can offer to do a neat, inexpensive job without digging into walls or ceilings. This PLEASES the customer—and the contractor makes his profit.

For instance, now is the time to go after school and college business. Extensive improvements in wiring are being planned and authorized. And the contractor who shows the way to do these jobs with Wiremold has a better chance to get this business.

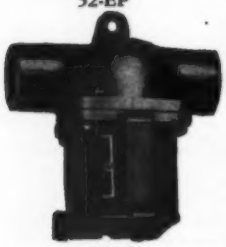


CROSS SECTIONS—ACTUAL SIZE.
No. 500 also takes 3 wires for short runs.

WIREMOLD
HARTFORD, CONN.

XPU-7

52-EP



321-C

COSTS ARE LOWERED— PROFITS INCREASED!

With the use of RALCO Products, because they make the job easier—
They are designed for that purpose without the sacrifice of quality and still at a fair price.
By using RALCO Explosion-proof Fittings, Junction Boxes, Heavy Duty Receptacles and Plugs, you help yourself to take the difficulty of installation out of the job. THAT'S SOMETHING.
The RALCO Line COSTS NO MORE—OFTEN LESS.
Team up with the line that pulls for your profits and not against them.

XPU-7 Junction Box is one of our only FIVE Boxes that will meet any Gasoline Pump job. They are easy and convenient to install with our Fittings.

52-EP Receptacle and Interlocked Switch for hazardous vapor and dust laden locations, makes a SAFE, DURABLE and LOW COST installation.

Heavy Duty Plugs and Receptacles with switch blade type contacts for 30 Amps. and over at 250 Volts D. C. or 600 Volts A. C. and the Pin and Sleeve type contact Plugs and Receptacles of similar construction for under 30 Amps. at 250 Volts A. C. or 125 Volts D. C. makes a DEPENDABLE and DURABLE Service Outlet for Portable Electrical Equipment and other purposes.

Tell us of the items that interest you in this line and we will send Catalog Matter and Prices.

RALCO MANUFACTURING CO.
125 N. Albany Ave. CHICAGO

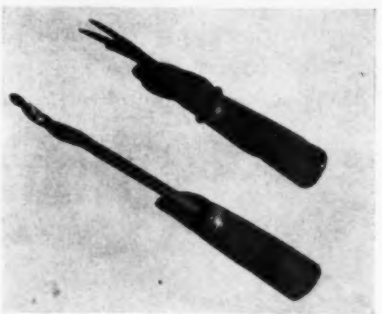
DISTRICT OFFICES
Atlanta, Baltimore, Boston, Kansas City, Los Angeles, New Orleans, Philadelphia, San Antonio, San Francisco

Joe Root with One of the Books of Duplicate Bills

job is entered as soon as the job is billed out. These books are then filed by date. When he wishes to get information on any job in the past, his ledger will tell him when the job was billed and he can then turn to the proper record book for the information.

ARMATURE TOOLS

Carl Johnson of the Parsons Electric Service, Minneapolis, Minn., has developed a pair of simple tools that he uses in conjunction with armature work. The shorter tool resembling a fork is a piece of tool steel set in a



handle and filed in the center at the end until it is a sharp knife edge on each side. This tool is used for cutting off insulation paper flush with armature slots.

The longer tool is made of drill rod shaped as shown with a little groove at the end. This is inserted in the armature slot after the insulation paper has been cut flush, the two ends of the paper are folded over one another in the slot by running the tool along the slot.

A story of replacing inadequate equipment and reducing future costs

SYRACUSE UNIVERSITY—SYRACUSE, N. Y.
(With Photographic Inserts of Several Trumbull Switch Installations)

IN changing inadequate equipment, overhead lines were torn down and replaced by new modern underground construction at the Syracuse University. This not only removed unsightly pole-line equipment, but permitted a new and safer layout reducing operating losses.

Transformer banks for each building were set up in a manhole just outside the building.

The disconnects for the incoming power and lighting services are Trumbull Type "C" Switches, located at the point of entrance inside the building.

Inserts in the above photograph show several of these disconnect switches, and also motor control of labor-saving devices, such as a washing machine started by a Trumbull 15 H.P. Remote Control Magnetic Motor Starting Switch with a Type "C" disconnect.

Much of the industrial business of this year will be in the millions of dollars of new material for replacements.

Thousands of surveys are being made and definite costs of rewiring programs figured.

Trumbull material, "built to last" at competitive prices will have a large place in these programs.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY
PLAINVILLE, A GENERAL ELECTRIC ORGANIZATION **CONN.**

UMI

THESE NEW IDEAL LUGS

CAN'T BE BEAT

That's how contractors express themselves! A running mate to Ideal Wire Connectors. They both make a perfect electrical and mechanical contact—quickly.

Leading contractors the country over are standardizing on Ideal Connectors and Lugs. And why not? They are time and money savers. Both approved by Underwriters' and Factory Mutual Laboratories.

IDEAL

WIRE CONNECTORS AND LUGS

IDEAL COMMUTATOR DRESSER COMPANY
1041 Park Avenue . . . . Sycamore, Ill.

Mr. J. E. Heaps of Altoona, Pa.

HERE'S A QUICK WAY TO sales AND profits

Writes J. E. Heaps Elec. Co. who have sold nearly 100 Chromalox Super-Speed Range Units, "We hope to sell many more in the next few months. Anyone can sell Chromalox above everything else at this time."

GO AFTER REPLACEMENT RANGE UNIT ORDERS with Chromalox Units Clapp & Leach sold 54 units in 4 weeks. Altoona, Pa. dealer made $136.50 in 2 months. Richmond, Va. contractor sold 48 units in 4 months, made $187.20 profit. Chromalox replacement units are a money-making depression-proof item. Range owners want to buy them. Easy to install, sizes to fit every make of range, old or new. Write for sure-fire sales plan already in use by many power companies and dealers *everywhere*. Liberal discounts: FREE sales helps, etc. No obligation.

You can do it, too!

MAIL WITH YOUR BUSINESS LETTERHEAD TODAY!

E. L. Wiegand Co., 7585 Thomas Blvd., Pittsburgh, Pa.
Without obligation, send us complete data about Chromalox Super-Speed Replacement Range Units and how we can make money selling them. There are approx. ..... elec. ranges in the territory we serve. Check which ( ) We sell elec. ranges ( ) We do not sell elec. ranges. ( ) Send us catalogs about Chromalox-equipped electric ranges.

Signed.....*Position*.....

NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

MAGIN ELECTED PRESIDENT OF SQUARE D

F. W. Magin, formerly executive vice-president of Square D Company, Detroit, Mich., and active head of the Industrial Controller Division at Milwaukee, was elected president at the annual meeting of the board of directors of the Square D Company, Detroit, Milwaukee and Peru, Indiana, on March 15.

T. J. Kauffman was elected chairman of the board, and H. S. Morgan of Detroit, secretary-treasurer. Mr. Morgan was formerly a member of the board of directors and retains his position on the board.

J. H. Pengilly, Los Angeles; L. W. Mercer, Vernon Brown and Carlton M. Higbie were elected vice-presidents.

CHANGES IN GRAYBAR FIELD PERSONNEL

Graybar Electric Co., New York City announces the appointment of L. H. Whitten as manager of its office at Washington, D. C. C. A. Strouss, formerly manager of the Youngstown office, has been appointed manager of the Akron office, and W. C. Robinson of the Pittsburgh office will replace Mr. Strouss in Youngstown.

COUCH PURCHASES SAMSON ELECTRIC

S. H. Couch Co., Inc., North Quincy, Mass., has purchased the business and goodwill of the Samson Electric Co., Canton, Mass.

All Samson products will be manufactured by the Couch Company at North Quincy, Mass., and the fire alarm and telephone lines will be sold through the Couch organization.

A subsidiary sales company, Samson Electric, Inc., has been organized to handle the sales of the amplifier line, which includes public address systems, centralized radio systems and PAM amplifiers. Richards W. Cotton, formerly sales manager of the amplifier division of the Samson Electric Co., will be sales manager of the new company, with offices at 89 Broad St., Boston, Mass.

BLIVEN RESIGNS FROM HARVEY HUBBELL

H. W. Bliven, who has been connected with Harvey Hubbell, Inc., as vice-president in charge of their New York office, resigned April 1 from the company.

Mr. Bliven has opened an office at 19 Rector St., New York City, as electrical manufacturers' representative, and will handle electrical lines to be sold through the wholesaler only.

The Liberty Bell Manufacturing Co., Minerva, Ohio, has just published a catalog covering the complete systems of Liberty burglar alarms, containing installation costs, auxiliary apparatus and wiring diagrams.

The following new appointments have been made by Bull Dog Electric Products Co., Detroit, Mich.:

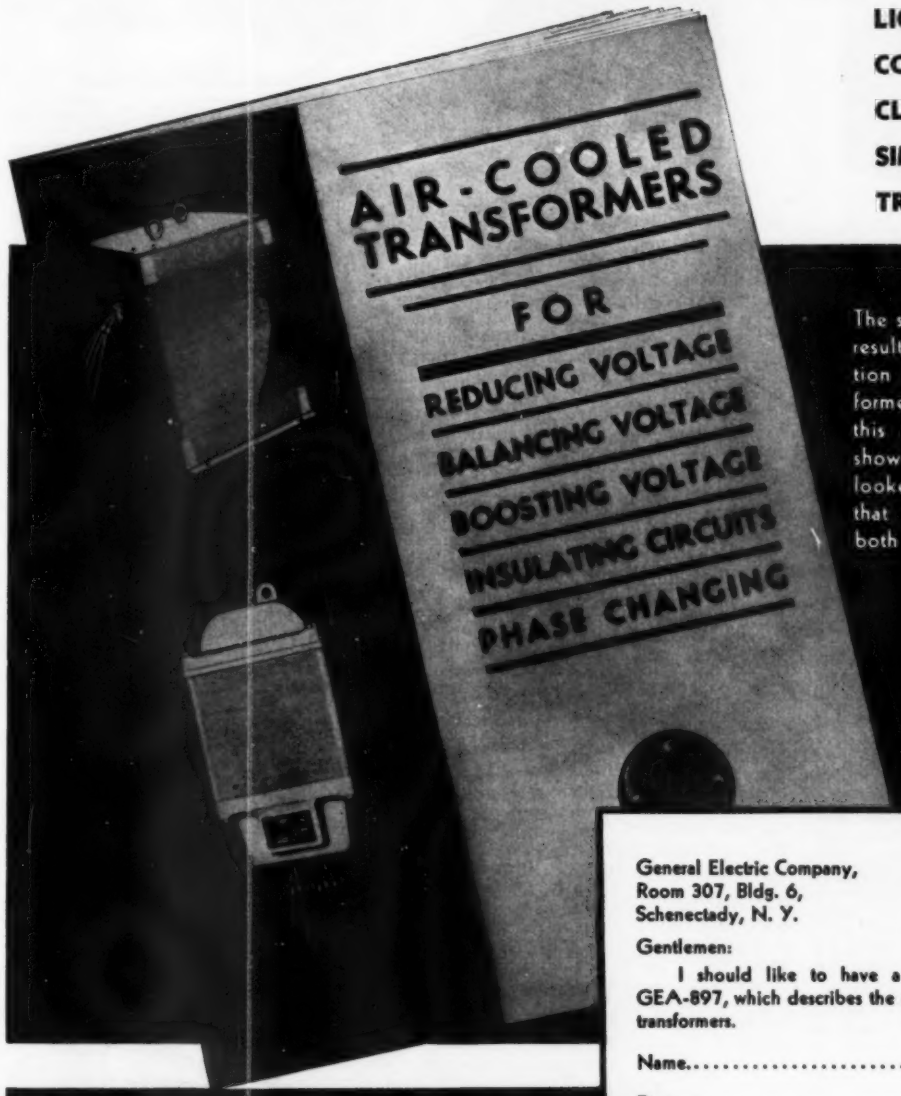
Electrical Sales Co., 3224 Walnut St., Denver, Colo., sales representative covering the states of Colorado, Wyoming, Utah, New Mexico, Montana and Western Nebraska.

Paul A. Michler, 5523 McComas Ave., Dallas, Texas, covering the states of Texas and Oklahoma.

Make sure you know ALL about G-E Air-Cooled Transformers

You can CAPITALIZE these features:

LIGHT IN WEIGHT
COMPACT
CLEAN
SIMPLE TO INSTALL
TROUBLE-FREE



The safety and economy which result from the proper application of G-E air-cooled transformers are explained clearly in this new publication. It may show you where you have overlooked an important application that would make money for both you and your customers.

MAIL THIS COUPON NOW

General Electric Company,
Room 307, Bldg. 6,
Schenectady, N. Y.

Gentlemen:

I should like to have a copy of your new bulletin, GEA-897, which describes the many applications of air-cooled transformers.

Name.....

Firm.....

Address..... A

405-50

GENERAL ELECTRIC

April New Products

Emergency Lighting System

Keepalite, a self-contained emergency lighting system, which supplies a separate source of electric current to its own high efficiency low voltage lamps, is being marketed by The Electric Storage Battery Co., Philadelphia, Pa. Unit consists

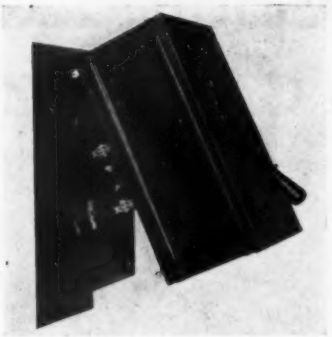
of an Exide battery, automatic relay, battery charger, switches and signal, all assembled in a compact case. Unit also has low voltage lamps, fixtures and wide diffusion globes. Unit is 2 ft. 9 in. long, 10 in. deep and 16 in. high, and can be mounted on shelf or wall, while one or more of the Keepalite lamps can be easily installed at different points and connected by wiring to Keepalite. When normal supply of power in a building is interrupted, Keepalite automatically and instantaneously lights the protected areas of the building. It gives split second action, without a hand touching switch. When normal power is restored Keepalite system automatically shuts off, and battery goes back on trickle charge.

Electric Blower

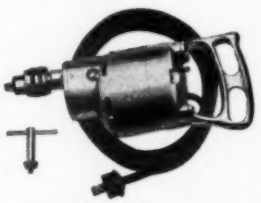
An electric blower which blows, suctions and sprays is announced by Ideal Commutator Dresser Co., Sycamore, Ill. This unit is made in four models, light, intermediate and heavy duty, and "hot and cold air" model. The light, intermediate and "hot and cold air" units have a 305 watt universal motor, voltage 32 to 275. Heavy duty unit has a motor mounted in fool-proof assembly ball bearings, 1/3 h.p. universal motor, voltage 110 to 275. Special attachments are available for this blower, which, the manufacturer claims, makes it available for all types of cleaning.

Circuit Breakers

A line of manually and electrically operated, trip-free, multi-pole air circuit breakers for control and protection of circuits in all fields has been announced by General Electric Co., Schenectady, N. Y. These breakers, designated as Type AB-2, are obtainable in metal-enclosed construction, with or without pull box, metal-enclosed with pull box and disconnecting devices, or mounted in dead-front and metal-enclosed switchboards. Ratings range from 15 to 400 amp., 250 volts d.c., and



600 volts a.c. Two independent overcurrent tripping devices are included—a thermal inverse time trip and an instantaneous magnetic trip. This equipment is constructed with a back-connected, base-mounted air circuit breaker enclosed in a metal box with a hinged cover provided with a breaker position-indicator and an operating handle for opening and closing breaker. Units have ventilating louvers in the door, and contact construction consists of solid main contacts, protected by intermediate contacts of Elkonite, arcing horns and a magnetic blowout.

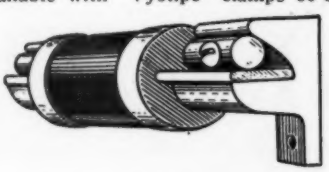


Electric Drill

A portable electric drill for light duty, weighing 6 lbs., is announced by Signal Electric Mfg. Co., Menominee, Mich. Drill contains Signal universal motor, 110 volts, 25 to 60 cycle, with a speed no load to 1700 R. P. M. Drill is 11¼ in. long, and 4 in. in diameter. Drill body and handle are cast aluminum. It is equipped with trouble-free "make-and-break" switch, and a three-jaw chuck with capacity up to ¼ in., and is furnished with 8 ft. of heavy duty rubber covered cord, with rubber plug and key.

Fuse Clamps

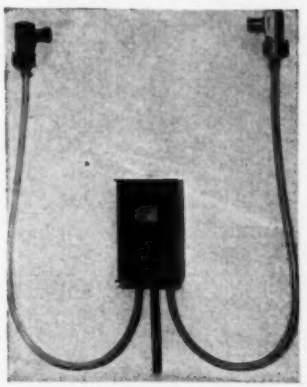
The Trumbull Electric Mfg. Co., Plainville, Conn., announces the addition of "Vystipe" fuse clamps to its 30 amp., 230 volt fusible "R. B." switches, making the entire line of "R. B." switches available with "Vystipe" clamps 30-800



amp. inclusive. Manufacturer states that tests have shown this pressure type of clamp, by compelling proper fuse alignment and contact, permanently reduces heating 80 percent over properly contacted ordinary ferrule fuse clamps 30-60 amp., and an average of 28 percent over properly contacted knife blade fuse terminals 100-800 amps.

Photoelectric Controller

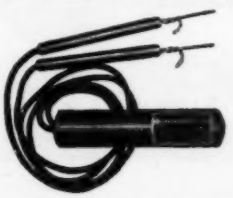
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a photoelectric controller known as "Photo-Troller", adapted to applications such as counting, limit switch, door opening, automatic weighing, etc. Unit is as-



sembled in a sheet metal cabinet with door and knockouts, and is available for any commercial voltage or frequency except d.c. Phototube or sensitive contact operates a sturdy grid glow tube directly which in turn closes a contactor capable of initiating any desired operation. Phototube and light source housings are of cast aluminum and available in splash-proof designs for mounting near sprays or in dusty locations. Device contains complete power supply for all auxiliaries including light source.

Voltage Tester

A pocket-size voltage tester requiring no lamps is being marked by the Switch & Panel Division, Square D Co., Detroit, Mich. Tester is enclosed in a fibre case. Long rubber covered lead



wires are provided with supporting springs at entrance to tester housing. Fibre handles insulate lead wires and sharp points make it possible to pierce insulation of wires without destroying insulation. Manufacturer claims it will register accurately the voltage as well as indicating whether it is a.c. or d.c.

"Standardise on STANDARD Transformers"
•
ALL TYPES
Indoor and Outdoor Service
•
Send for Descriptive Bulletin
•
STANDARD TRANSFORMER CO.
Warren - - - - - - - - - - - Ohio

FLOOR BOXES
ORDER
"Latrobe"
CARRIED IN STOCK
BY OVER 300 DISTRIBUTORS
Fullman Manufacturing Co.
LATROBE, PA.

"MEASURE MARKED"
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"MEASURE MARKED"
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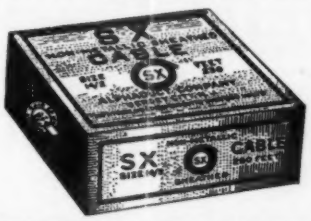

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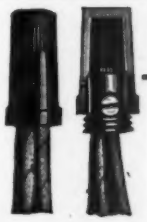

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H. N. GOODELL

H. N. Goodell, western district manager of the Graybar Electric Company, passed away at his home in Kansas City on March 19 after an illness of several months. He was in his 54th year.

Except for a few years of service as a railroad clerk, Mr. Goodell spent his entire business career with the Western Electric Company and with Graybar. He began his work with the company in 1906 and his progress was rapid.

By 1909, he had been appointed chief clerk of the Chicago supply house. Three years later, he was transferred to New York for an educational course and later was sent to the Omaha branch as manager.

In the spring of 1917, Mr. Goodell was named as assistant central district manager with jurisdiction over the Omaha and Minneapolis branches. In 1918 he was appointed western district manager with headquarters at St. Louis. In recent years, he has made his headquarters at Kansas City.

The 1933 catalog covering I-T-E circuit breakers and U-Re-Lites has just been released by the I-T-E Circuit Breaker Co., Philadelphia, Pa. Each unit is fully described, illustrated, containing engineering data, price-lists, dimensions and wiring diagrams. Large photographs of Multumite steel-enclosed switchboards are shown in the back part of the catalog, together with a page devoted to engineering information required when ordering.

In addition to the material used in a previous catalog which has been carefully revised, new apparatus is also listed.

Stanley Electric Tool Co., New Britain, Conn., has appointed Herb Coats, Pacific Coast representative, with offices at 576 Monadnock Building, San Francisco, Cal. Mr. Coats was formerly associated with Black & Decker and Van Dorn companies.

General Electric Co., Schenectady, N. Y., has published Catalog GEA-1439B, covering G-E Novalux open-type floodlights, types L-51-B1 and L-51-B2. This pamphlet contains descriptions of the units, photographs of installations, as well as price-lists.

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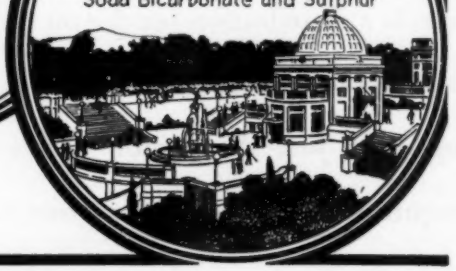

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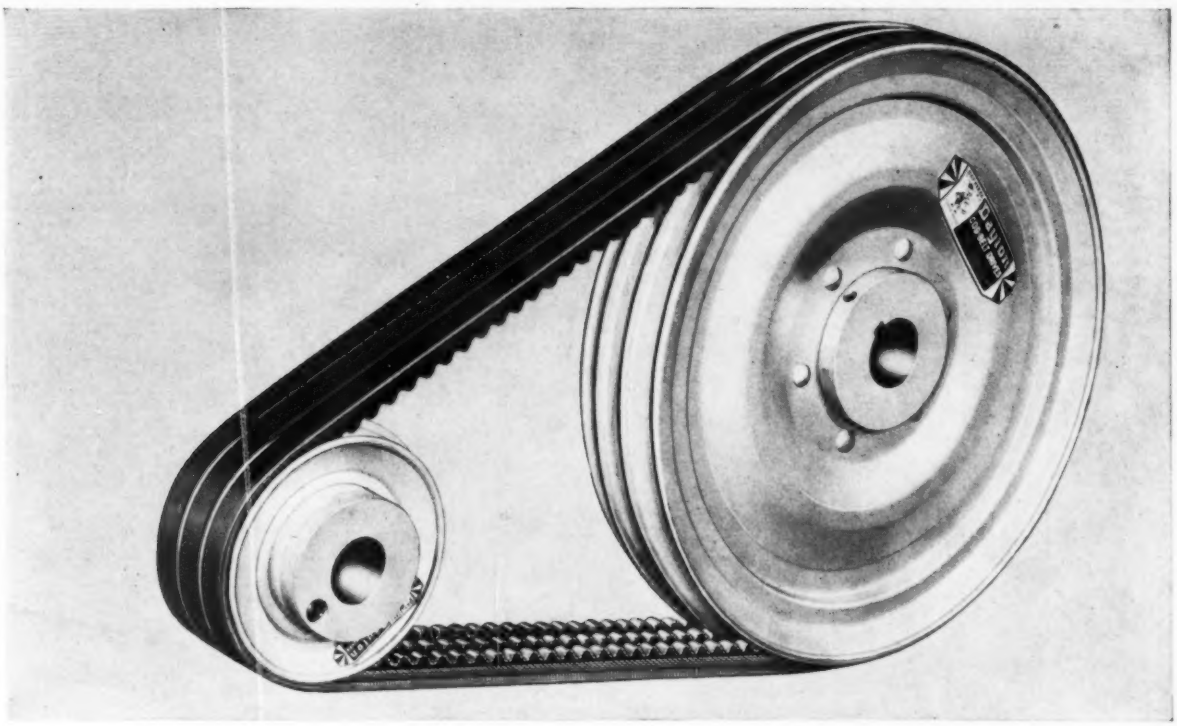

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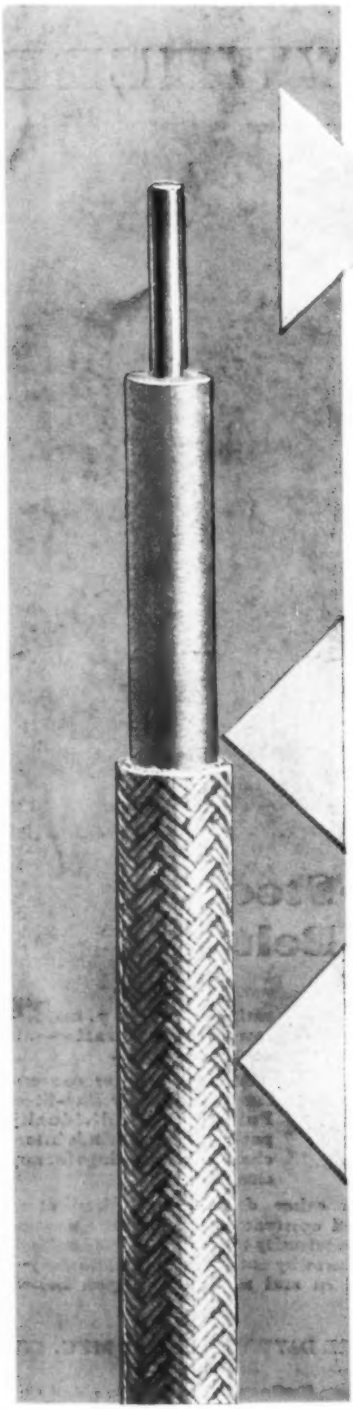

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